the OIL AND GAS JOURNAL

We often speak of Timken bearings as the "hidden product" because, once installed in a machine, they can't be seen; in fact, in many cases, they are never seen—and seldom thought of—during the entire life of the equipment. It's "out of sight out of mind."

They make their presence felt in many ways, however. In smooth, frictionless machine operation; in absence of wear; in constant protection against radial, thrust and combined loads; in freedom from the need of frequent lubrication or other maintenance attention; in dependable operation through years of faithful service.

Timken tapered roller bearings have had a prominent part in many oil well drilling records. You need them today more than ever before. Make sure you have them in any new drilling and pumping equipment you buy. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address "TIMROSCO".

TIMKEN
TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST ↔ LOADS OR ANY COMBINATION

PRICE 50 CENTS

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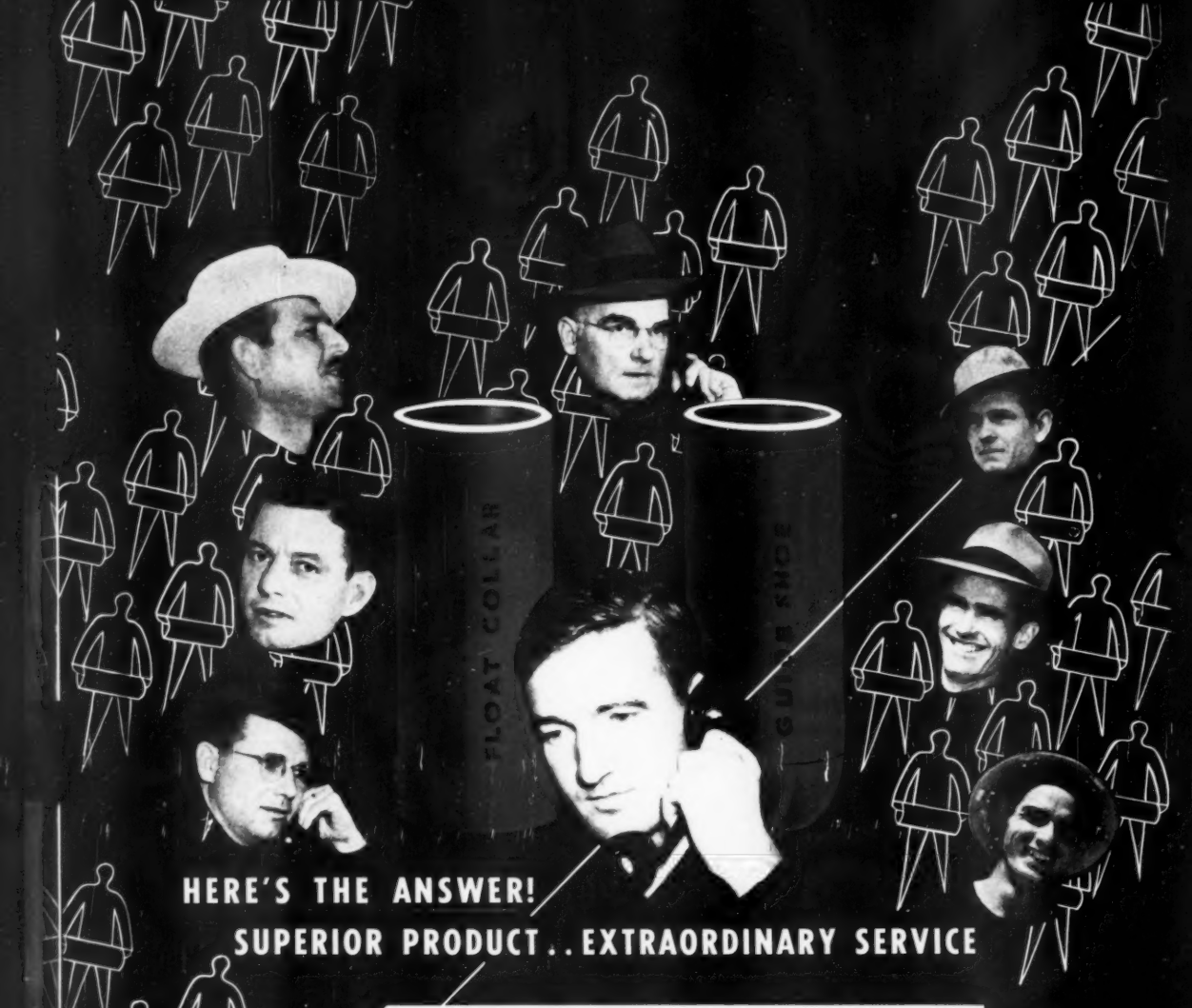

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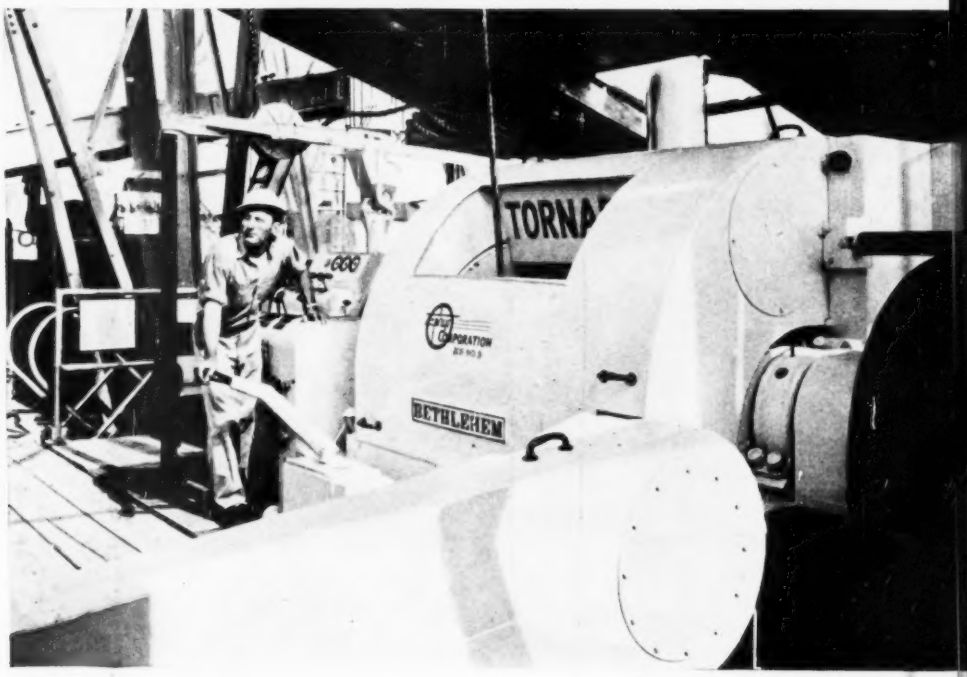
HALLIBURTON OIL WELL CEMENTING COMPANY

DUNCAN, OKLAHOMA

BETHLEHEM TORNADO

... a Truly GREAT Rig for Deep Drilling

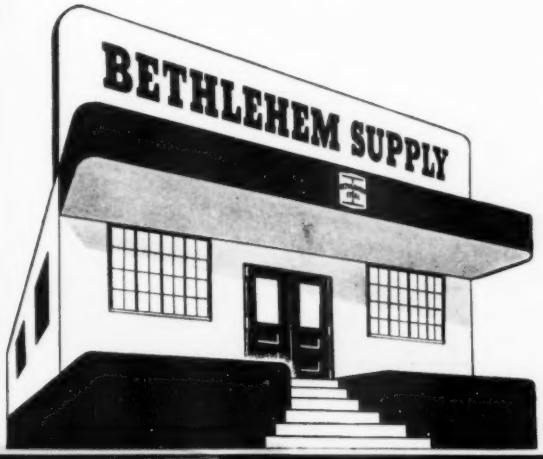


Powerful, of course. But power isn't the whole story, not by any means.

In designing this rig, we wanted something pretty special—power *without* complicated mechanisms; power smoothly flowing, smoothly controlled; power so well bridled that the driller would always be in complete command.

Bethlehem's Tornado is 100 pct air-controlled, and levers are only inches away from the driller's normal position. Operation is further simplified by air-actuated, self-adjusting clutches. Speed changes can be made instantly. The air-cushioned transmission reduces shocks, jars, and jolts.

In the field, Tornados have brought a new kind of smoothness and flexibility to deep-hole drilling. We're proud of these rigs, and we'd welcome the chance to tell you more about them.



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The kind of air a man works in has a lot to do with how much work he can turn out.

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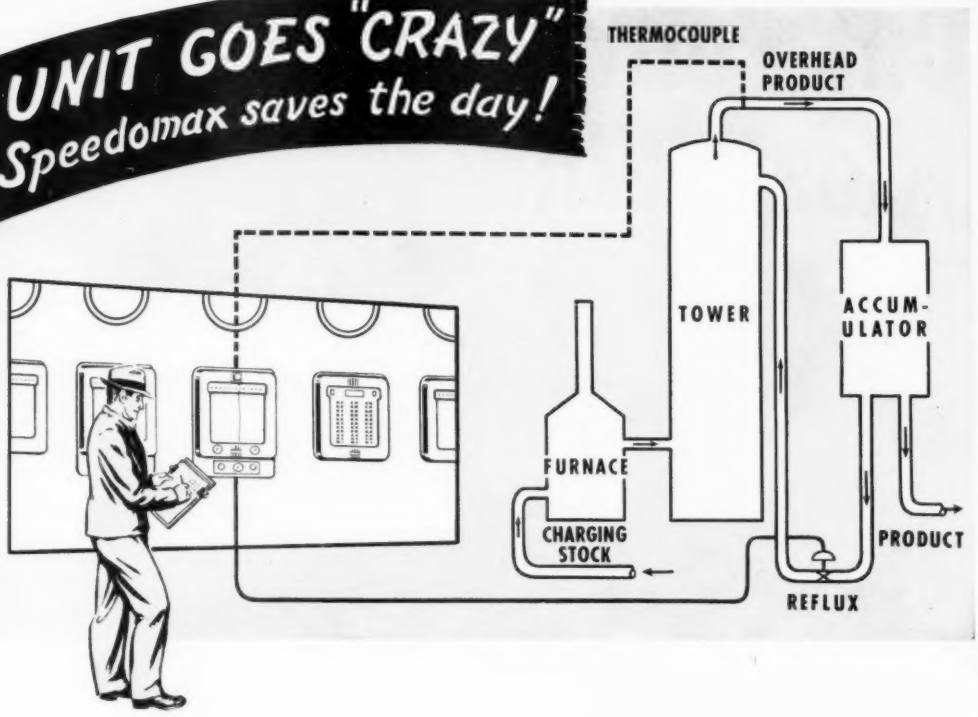
UNIT GOES "CRAZY"
Speedomax saves the day!



L&N PNEUMATIC CONTROL gives you —

- ***Superior stability of control point***
- ***True "no bump" switch*** from manual to automatic regulation, as well as vice versa
- ***Rate action*** fully integrated into the control circuit for smooth, swift recovery from upsets
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Send for catalog

For details about Speedomax Pneumatic Control, see our new **Catalog ND4B**. Leeds & Northrup Co., 4959 Stenton Ave., Phila. 44, Pa.

Early one morning, while a refinery tower was busy fractionating pressed distillate, a bad upset hit the unit. *Charging stock contained water!* A good sized slug hit the furnace tubes and immediately flashed to steam. Terrific pressures built up in the tubes, shooting the stock into the tower far below temperature. Charge pumps raced to fill the void. Again and again, for more than ten hours, slugs of water kept the unit and its operators in an uproar.

Yet all the while the unit was taking this abuse, the Speedomax Pneumatic Controller handling tower top temperature kept the fractionator relatively stable. By varying reflux feed widely and accurately, it held overhead product well within specs. Ninety per cent of the time temperature was held to 3 F. And it never wavered more than 5 F.

Reason for this phenomenal performance? Speedomax Pneumatic Control's *truly stable rate action*. Although pressure and flow in the tower ran wild, Speedomax outmaneuvered temperature at every turn. It saved the day!

With any other control, emphasized refinery men, all of the day's product would have been run to "slop." So Speedomax not only saved the day; it paid for itself several times over during the one shift.

The same features which saved so dramatically in this emergency also make Speedomax pay off during normal operation. Let us send proof.

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LEEDS & NORTHRUP CO.

Bul. Ad ND46-33A-702(2)

The Oil and Gas Journal, published Thursdays by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910. at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $3 yearly. Copyright 1950.

Cut Petroleum Pumping Costs With *Electrifugal* PUMPS

1 SAVE ON INSTALLATION! *Electrifugal* pump comes ready to connect and run. No extra parts. Easy to handle. Requires small installation space.

2 SAVE ON OPERATION! Pump and motor designed together for high efficiency. Every unit tested at factory and guaranteed to deliver rated capacity.

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Electrifugal and *Texrope* are Allis-Chalmers trademarks.

OVER 42,000,000 GALLONS OF PETROLEUM PRODUCTS are pumped annually through 15 Allis-Chalmers close-coupled pumps at this new midwest bulk station.

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Electrifugal pumps range from 10 to 1600 gpm with heads to 525 ft. For information, see your Allis-Chalmers Authorized Dealer or Sales Office. Or write for Bulletin 52B6059E. A-2974

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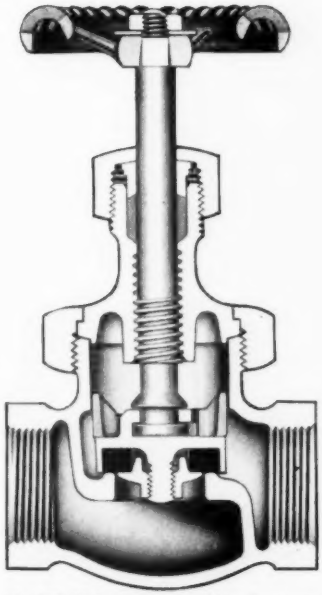
NEW VALVES FOR LP-GAS NOW IN THE CRANE LINE

DESIGNED FOR TIGHT SEATING AND SIMPLIFIED DISC RENEWAL



No. 130, Globe, Screwed. Working Pressures: 400 pounds gas or oil; 150° F. Max. Temp. 400 pounds water; 200° F. Max. Temp. Sizes: ¼ to 2-inch

These new Crane globe, angle, and lift check valves more than meet Underwriters' specifications for efficient handling of Liquefied-Petroleum Gases. Made of finest quality Crane Special Brass, these valves—with renewable composition discs—are constructed to withstand severe operating strains . . . can be dismantled and reassembled repeatedly without affecting efficiency. The features below show how these valves meet LP-Gas requirements.

TIGHT SEATING—all valves are equipped with a Crane No. 6 composition disc cemented tightly into disc holder as an added precaution against leakage.

DURABLE COMPOSITION DISC—made of synthetic materials highly resistant to effects of petroleum products. Soft enough for tight seating, yet plenty stiff and resilient to withstand hard and repeated usage.

EXTRA-TIGHT STEM SEAL—stuffing box is of liberal capacity and is filled with Crane one-piece molded asbestos packing especially selected for LP-Gas services.

SUITABLE FOR OTHER SERVICES—although these valves were designed for safer handling of LP-Gases, they are highly recommended for hot or cold water, compressed air, gasoline and light oils at pressures and temperatures not exceeding valve ratings.

For further information, see your Crane Representative or write for FOLDER AD-1820.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.
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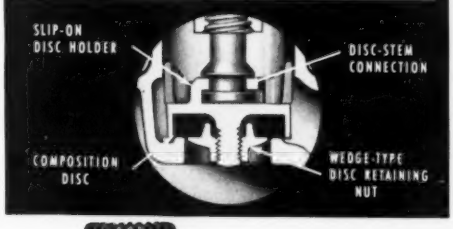
HOW CRANE DESIGN ADDS TO DISC LIFE...SPEEDS DISC CHANGES

New wedge-type disc-retaining nut reinforces composition disc against strains and distortion caused by tight valve closure. This feature adds materially to disc life.

Composition disc can be renewed without removing valve from line. Merely open the union ring bonnet joint—or cap joint on check valves—and lift out complete disc assembly. Replace the disc holder with a spare containing a new disc. Reassemble the valve.



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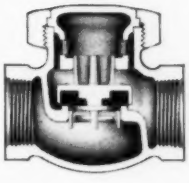
VALVES • FITTINGS • PIPE • PLUMBING AND HEATING

No. 131, Angle, Screwed



No. 132, Horizontal Lift Check, Screwed

F A M O U S

Caustic Comments

In the course of conversation at a cocktail party, a tactless woman remarked to the late Alexander Woollcott, "I don't like you . . . I simply cannot *bear* nitwits."

"You are not at all like your mother, are you?" was Woollcott's caustic rejoinder.

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To better serve industry, Dow has unequalled distributing facilities.

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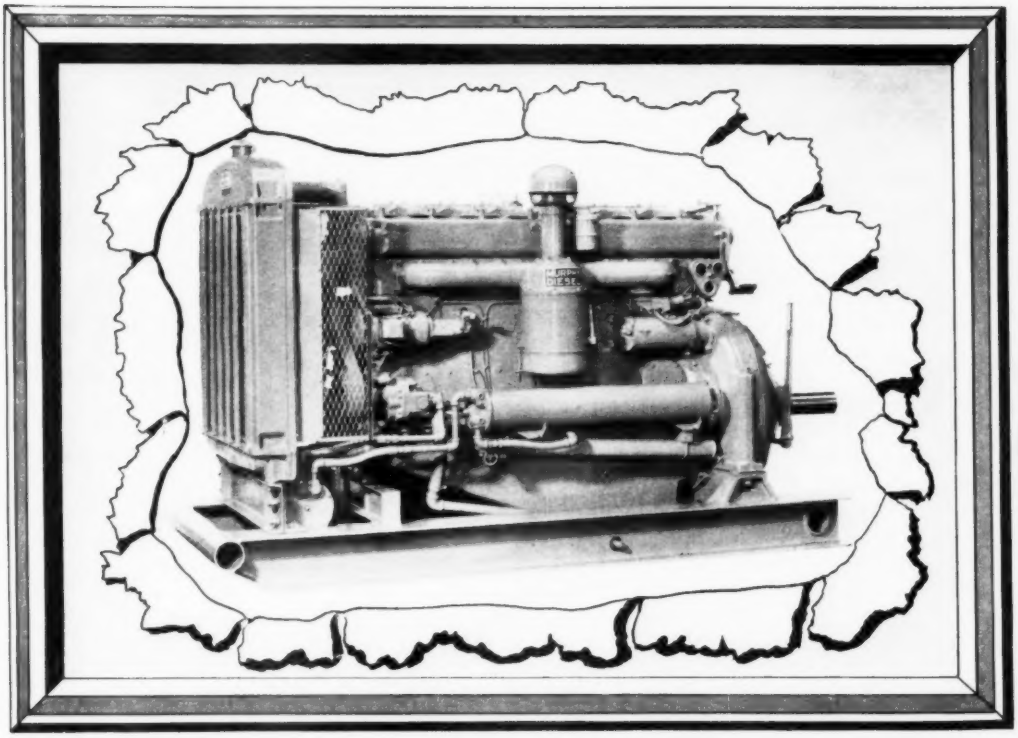

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ONE of the most important keys to profitable operation is economical, dependable power — the kind of power you get from Murphy Diesels. Because it is a "true" diesel with unit fuel injection, the Murphy Diesel uses *less fuel per horsepower hour than any other engine of comparable power rating.* Because the design is simple and all working parts are built to last, the Murphy Diesel is dependable.

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Heavy duty power
for the oilfields
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Los Angeles, Cal.		**Odessa, Texas**		**San Antonio, Texas**
Engine Sales & Service		Electric Service & Supply Co.		J. E. Ingram Equipment Co.

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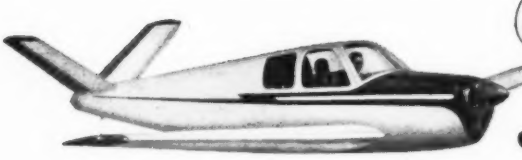
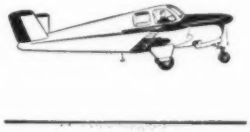


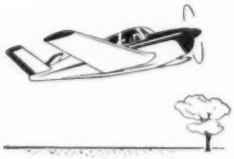
Beechcraft

a better buy than ever!

New Beechcraft propeller



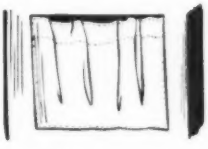
Increased take-off horsepower



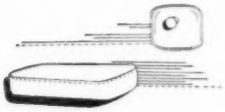
Faster-action landing gear

Increased, faster flap travel

New upholstery combinations

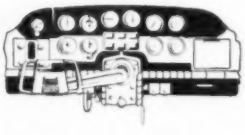


Three new map pockets

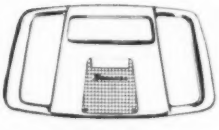


Four new arm rests

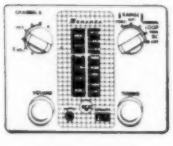
New exterior paint design



New instrument panel design



Safety-type control wheel



New radio with VHF channels

Access door for oil tank

It has no equal in performance, speed, economy, strength, safety, style and comfort!

The new B35 Beechcraft Bonanza exceeds all promises for a speed-with-economy plane that's roomy, comfortable and easy to fly! New performance features at moderate horsepower add to its versatility and safety, hold operating and maintenance costs at a *business economy* level! New operating conveniences and luxury appointments plus scores of refinements call for a personal inspection because there's room here to show only a few. See it! Get all the facts! You'll agree this greater-than-ever Beechcraft Bonanza is a better-than-ever value!

Top speed, 184 mph
Cruising speed, 170 mph
Range, 750 miles
Fuel economy, 9.5 gph

Get all the facts! There are hundreds more — about the extra advantages of the new Model B35 Beechcraft Bonanza. Check with your nearest Beechcraft distributor or dealer, or write for complete information on your company letterhead to Beech Aircraft Corporation, Wichita, Kansas.

Beechcraft BONANZA

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

They Say—

Enoch Arden

Cartoon by Reg Manning, reprinted through courtesy of McNaught Syndicate, Inc.

Good Scurry Article

Sir:

Enclosed herewith is my check for $3 for which please enter my subscription to The Oil and Gas Journal.

I should like to compliment your publishers on the article on Scurry County by D. H. Stormont *(February 2, page 46)* and would like my subscription either to start with your issue of February 2, 1950, or that I might have a separate copy of Mr. Stormont's paper.

N. A. Rousselot,
Manager, field operations, Seaboard Oil Co. of Delaware,
Los Angeles.

Recycle Gasoline Problem

Sir:

Congratulations on your editorial on page 65 of the February 16 issue.

There is another "stepchild" in the market that we believe has a very immediate and serious impact on all phases of the crude-oil and refining industry, namely the tremendous increased production from recycle plants of motor gasoline, kerosine, and distillates.

We firmly believe that condensate and gas flowing into these plants should be subject to the same type of proration rules as affect crude. We believe conservation authorities must now consider an immediate suitable proration and monthly allowables of both the raw materials as well as the market demand. The raw material is a hydrocarbon just as much as crude is.

We understand that there are 45,000 bbl. a day of the recycle products moving by tank car and barge into the Mid-Continent area, most of which is sold on the open market, thus in turn affecting the market demand for crude and its products. The recycle products are direct competitors of the products of most independent refiners because both are usually sold on the spot market, and with gasoline stocks rising, it becomes more apparent that this raw material must be subject to the same conservation and market-demand factors as is crude.

You call attention to the fact that a large part of the supply of natural gasoline comes from plants owned by companies who directly or indirectly are refiners and producers, and we believe that the same situation applies to recycle plants and perhaps even to a greater degree.

It would therefore be most reasonable that the large producers of condensate who are cooperating with the conservation authorities would likewise welcome similar conservation for condensate.

In conversation with many independent refiners, they have generally stated that the recycle products situation is a more serious threat to the inland independent refiner than is any immediate problem caused by the importation of foreign crude.

If we want to have a healthy crude

1440

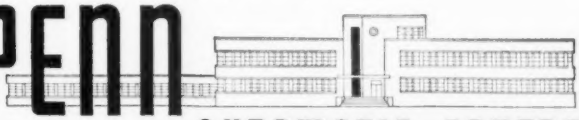
minutes of
ENGINE
PROTECTION
each day of the year!

That's right . . . PENN Safety Controls protect your engines "around the clock". At the first hint of excessive water temperature, overheated bearings or lubricating oil pressure failure the PENN Control goes into action.

It will sound an alarm, activate a warning light or stop the engine . . . whichever you choose. This prompt action makes it possible to investigate and correct the fault before engine damage occurs. Thus costly repairs and production delays can be avoided.

PENN Safety Controls are available in three basic types to fit your specific requirements (1) temperature (2) oil pressure (3) combination temperature and oil pressure. Get full information on this *low-cost protection.* Write **Penn Electric Switch Co., Goshen, Ind.** Export Division: 13 E. 40th Street, New York 16, U.S.A. In Canada: Penn Controls, Ltd., Toronto, Ont.

PENN



AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, PUMPS, AIR COMPRESSORS, ENGINES, GAS RANGES

market, something must be done immediately to stop the unrestricted flow of recycle products, not only in view of the mounting gasoline stocks, but in view of increasing numbers of independent refiners who have been forced to shut down, and in view of the definite and immediate need that the large refining interests in turn must soon be obliged to curtail their refinery runs, which delayed action has long been needed in view of our storage and market demand conditions.

Bell Oil & Gas Co.,
M. L. Freese, vice president,
Tulsa.

Fuel vs. Design

"The heart of the issue is how the higher compression essential to increased efficiency of fuel consumption is to be made feasible—whether it shall be by the use of high-octane fuel or by basic changes in engine design.

"To make the best use of our available crude we must take the bulk of our gasoline from the lower-octane 'middle barrel,' where the yield is highest. The aviation industry fortunately has already begun to shift to the lower-octane range with its continuous-combustion jet engine. This is no time for the auto industry to increase its octane standards—a move that would cancel the very savings that are sought in the move to high compression."

Alex Traub, independent automotive engineer, writing in Scientific American.

Change in Venezuela

"It seems probable that the change in attitude in Venezuela, which is in evidence recently, is probably the result of their awareness of the competition of Canadian oil with Venezuelan oil. It also seems probable that Venezuela will now grant concessions again and will have to compete with Canada in enticing American oil companies to come and develop oil reserves."

Gerald H. Westby, president, Seismograph Service Corp., speaking in Tulsa.

Feruvian Oil Law

Sir:

I am writing in reference to an article appearing in the January 12 issue of The Oil and Gas Journal describing the new Peruvian petroleum law which has been published in its entirety in the Peruvian newspapers. . . .

I feel that your article was misleading, especially with reference to the paragraph stating that concessions will be bidded for over a period of 6 months and will be granted to the highest bidder. This does not appear anywhere in the published law, except with regard to national reserves and free lands. . . .

In the case of disputed areas in which two concessionaires apply for the same area in whole or in part, or in case a concessionaire applies for a concession on land for which another party claims he has the petroleum rights, then the 6-month term comes in. In the former case, the law reads that the two or more concessionaires may bid for the disputed property and the concession will be awarded to the highest bidder.

I repeat that this is applicable only to free areas and national reserves as indicated by the proposed law.

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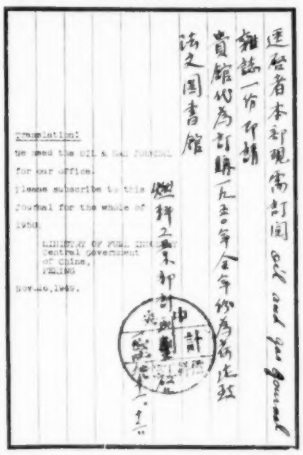
Chinese Puzzle



COUPLE of weeks ago we gently needled our circulation department for not being able to translate Italian well enough to understand what endogenous force was.

Miffed at this reflection on their erudition, the boys set up the claim that they can read anything, including Chinese. As proof they offered the subscription order pictured here. It was strongly implied that the translation typed thereon was supplied by the circulation department for the benefit of uncultured editors.

But we foxed them. At 5:01 p.m., after they had all gone home, we rifled their files. A little FBI work comparing typewriting quickly proved beyond shadow of doubt that the translation was not written in the circulation department but was on the order when it left China. As a clincher, there was a letter, all in English, repeating the translation. Without this bilingualism, we are now convinced, the circulation boys couldn't have read anything except "Oil and Gas Journal" sideways. (Apparently our title doesn't adapt itself to ideographs).

Getting Up Steam

THAT same picture of endogenous force, incidentally struck a cord in the memory of Maurice E. Kirby, president of Omaha Drilling Corp., who was in Larderello during the war as a major in the Engineer Corps, helping the Italians get some of their generating power back into production after the Germans had wrecked it.

He explained—too late to assist the lame brains in our circulation department—that endogenous force is just a $3 word the Italians use for natural steam wells.

"At this location," he wrote, "about 75 miles south of Florence, there is an area of about 25 sq. miles where wells drilled into the high-temperature rocks obtain steam of about 450 lb. pressure at the well head. These steam wells, unlike geysers, will blow steadily, even when uncapped. The Italians run the steam through heating coils and make steam of more pure water, and this secondary steam in turn operates about 160,000 kw. of power.

"The natural steam is so laden with mineralizers that it is too corrosive for use in turbines directly. After heating pure water, the Italians condense the natural steam and extract a long list of mineral compounds, of which borax is one of the main products.

"The Italians had a number of oil-field rigs, both rotary and cable tool, which they were using to drill the wells. The average American oil-well driller who has to bother with keeping his drilling mud just right would certainly be in his heaven in Larderello. I watched a well being drilled, and the natural steam coming out of the packed-off discharge was blowing the cuttings clear across a canyon. They were drilling through a packer with a horizontal discharge located under the derrick floor."

Thanks, Brother Kirby, for this valuable information. We'll pass it along to our circulation department so it won't get steamed up over endogenous force again.

—Henry D. Ralph

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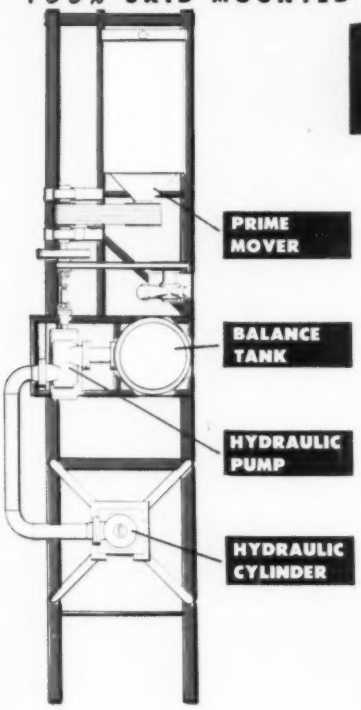

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H.R. 6000

Washington reports reveal that proponents are leaving no legislative stones unturned to assure the final passage in this session of Congress of the bill commonly known as H.R. 6000. The supporters of the bill, which would expand the coverage and pension benefits of the Social Security Act, hope to secure final approval in substantially the same form as passed by the House of Representatives last year.

Indicative of the certainty that the scope of the present act will be extended, one of the larger oil companies has completed plans to revise upward its own pension payments, in the belief that the federal provisions will also be liberalized.

Regardless of the merits of the over-all program, it is mandatory that the bill before approval be revised so that there will be no ambiguity as to its application in the oil industry. As now proposed there is no doubt that refiners and jobbers would be held responsible for the Social Security payments on additional tens of thousands who would be considered "employes" as defined in the present bill.

Domestic distribution of oil products is largely carried on through dealers who lease marketing facilities from wholesalers and refiners. These dealers are in no sense employes of the supplying lessors, but are independent operators who play an important part in the business life of thousands of communities.

The right of service-station operators to Social Security is not involved. The dealers are fully protected under H.R. 6000 with a provision applying to self-employed businessmen. Their employes will have the same protection as other employes.

The dangers inherent in a system in which the lessor of a service station would be held responsible for the Social Security payments of the lessee and possibly the employes of the lessee are readily apparent. The lessor would be accountable for those over whom he has no control or affiliation. The yearly payments would add materially to direct operating costs.

Nor are the disadvantages confined to the lessor. The lessee would lose his identity as an independent operator during a period in which every effort is being made to strengthen the position of small business enterprises.

It is certain that, for their own protection, the jobber and refiner would have no choice but to end the leasing arrangements and return to the operation of their own stations, a development which would not work out to the best interest of anyone concerned, including the customer. It would subject the operating companies to renewed charges of monopoly and would probably result in restrictive legislation.

The issues involved in this matter in no sense are confined to the petroleum industry, and opposition to this specific provision of H.R. 6000 should be based on broad public policy.

THIS WEEK

PRODUCTION—Texas junks MER allowables system, returning to 1947 depth-and-acreage formula. . . . Helps East Texas and older fields, hits flush fields. . . . Sets March allowables at 1,944,000 bbl. daily, lowest since July. . . . ¶Scurry County fields ordered shut down to check reports of rapid decline in bottom-hole pressure. . . . ¶Oklahoma allowables cut 10 per cent, but new wells will keep output close to February's 407,000 bbl. daily. . . . Kansas allowables unchanged for March at 270,000 bbl. daily. . . .

TECHNOLOGY—Texaco develops new engine which won't knock on any fuel. . . . ¶First test of platforming process proves success in upgrading straightrun gasolines and naphthas. . . . ¶Combination neutron and gamma-ray well-logging device announced. . . . ¶Economical method of making ethylene from refinery gases passes pilot-plant tests. . . . ¶Pipe liners pleased with success of first practical corrosion short course. . . .

ACTIVITY—Daily average crude-oil production increased 5,675 bbl. for week ended February 25 to 4,919,350 bbl. . . . ¶Well completions dropped to 644 for the week compared with 701 for previous week and 535 in same week last year. . . . ¶Wildcat completions totaled 120, off 24 from previous week but up 8 from last year. . . . ¶Rotary rigs operating in United States decreased 16 rigs for week ended February 20 to 1,881 or 81 rigs less than on same date last year. . . .

TRENDS—Stocks of gasoline in all areas east of California are nearer previous year's inventory level than they have been in over a year. . . . Stocks on February 18 were only 2,750,000 bbl. greater than last year and were 1,100,000 bbl. less than the peak reached on March 26, 1949. . . . ¶East-of-California refinery production of gasoline since January 1 has been 3.4 per cent greater than last year but the stock increase has been 7.3 per cent less. . . .

NATIONAL AFFAIRS—Deadlock deepens on British ban on dollar oil. . . . British adamant. . . . Washington inactive. . . . Companies devoid of alternatives. . . . ¶Synthetic-rubber program may be continued virtually unchanged as administration's proposal meets opposition at hearings. . . . Phillips' spokesman says it discriminates against oil companies. . . . ¶Ways and means committee gives once-over-lightly treatment to touchy questions of taxing cooperatives. . . . Hurries to end revenue hearings, suggesting that few changes in tax law may result. . . .

GULF COAST—Pure opens $20,000,000 lubricants plant at Nederland, Tex. . . . ¶Government's briefs in tidelands suits tell Supreme Court Texas Republic never owned offshore lands and neither Texas nor Louisiana has any claim now. . . . But Louisiana prepares to resume offshore oil leasing. . . . ¶Major operators brought in majority of successful wildcats in South Louisiana last year. . . .

INTERNATIONAL—Venezuelan refining increased 21 per cent last year. . . . Now handles 11 per cent of country's crude. . . . ¶Hints of more friendliness toward private oil industry in Latin America may lie in . . . Shifting Argentine attitude. . . . Pemex' optimism on new Mexican program. . . . Suggestion for continental public-relations program. . . . ¶Iranian parliament considering 50 per cent increase in royalties, other concession changes. . . . ¶Austria accuses Russia of ruining its oil fields. . . .

PURE LUBES.—Pure Oil Co.'s ultramodern lubricants plant, adjacent to its Smith's Bluff refinery at Nederland, Tex., is now in operation. Costing $20,000,000, the plant has a capacity of 90,000 gal. of finished blending stocks daily.

Revolutionary Engine

Texas Co. reveals successful testing of knock-free engine which operates on wide variety of fuels; air swirl is key

George Weber

NEW YORK.—An automobile engine that will burn any fuel without knocking may be just over the horizon if further developments bear out the experiments conducted in the Beacon, N. Y., laboratories of The Texas Co.

If this engine should come into general commercial use—admittedly years hence—it could end the "octane race" among refiners and would permit internal-combustion engines to use a much larger fraction of a barrel of crude oil than at present.

The Texaco knockless engine embodies a new principle in the design of reciprocating internal-combustion engines. Its principal novelty is an air swirl in the cylinder which keeps the fuel from being detonated at the wrong time. The swirl works equally well with diesel-type and spark-ignition engines.

To date the TCP (for Texaco combustion process) engine exists only in the form of single-cylinder test models. But these test engines have shown consistent knockless performance under widely varying conditions involving compression ratio, speed, load, pressure, temperature, and type of fuel.

Satisfied with these laboratory findings, engineers are now planning the design, fabrication, and road testing of a multicylinder TCP engine with which they will evaluate the commercial application of the new combustion principle.

Background.—The TCP engine has been the subject of some conjecture in the industry for several years. The first and only official pronouncement of the project was a technical paper published by the Franklin Institute in April 1946 (J.F.I., Volume 241, No. 4). In that paper three Texaco men outlined the theory underlying their experiments.

Laboratory investigations have since continued on schedule, and although the company has not encouraged publicity for its project, neither has it refused information to outsiders showing legitimate interest in the work. A technical paper on the project is now planned for possible presentation this summer.

The theory behind the TCP engine originated from studies of the knock phenomenon occurring in the two main types of reciprocating internal-combustion engines: spark ignition (Otto-cycle) and compression ignition (diesel cycle). In both types the combustion chamber contains a large volume of combustible fuel-air mixture before combustion takes place.

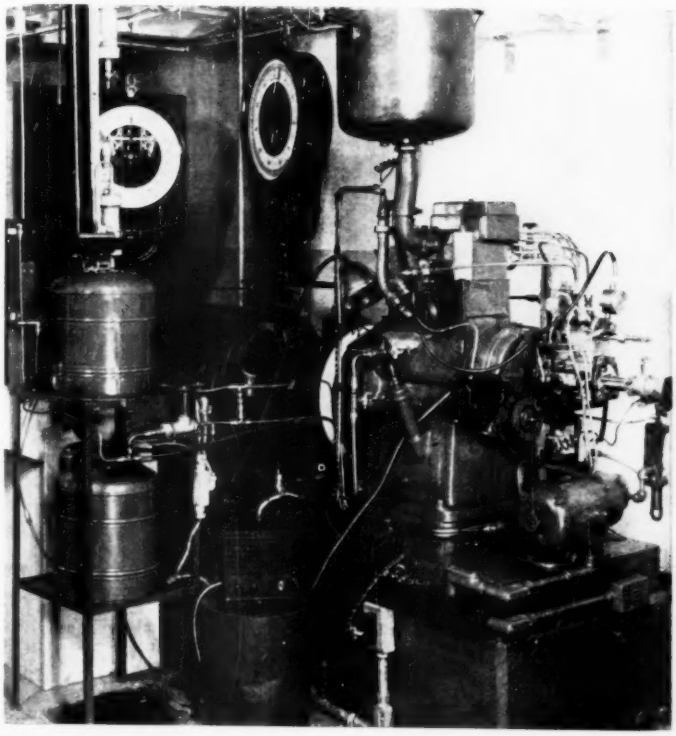
Why engines knock.—In the Otto-cycle gasoline engine, accepted theory explains knock as the autoignition of the "end gas," that portion of the mixture at greatest distance from the spark plug, which detonates or knocks by compression ignition before the flame front reaches it. Knock is prevented by using fuels of high resistance to spontaneous ignition, or high octane number.

In the diesel engine, knock results from delayed ignition of the fuel-air mixture as it undergoes compression. Therefore fuels of high cetane number, showing low resistance to spontaneous ignition, reduce knocking.

Detonation or knock in both cases results from a long residence time for fuel in the combustion chamber. In theory, then, knock should be prevented if fuel were burned almost immediately following its introduction to an air-filled combustion chamber. If this were possible, engine operation would be made independent of the spontaneous-ignition characteristics of the fuel.

The swirl.—After much experimental study, the theory was applied practically by inducing air swirl in the cylinder. Fuel, injected as in the diesel cycle, is fed into the passing air to form a combustible mixture, which is spark-ignited almost instantly. By coordinating the rate of injection with the rate of air swirl, combustible mixture is continuously formed and burned just downstream of the injection point in the vicinity of the spark plug.

As newly formed mixture is fed into the flame front by the air swirl, combustion products are swept away. Full load is obtained when injection is continued until the combustion products reach the injector. For part-



An adaptation of the Texaco Combustion Process to a single-cylinder engine is shown here in a test setup at the Beacon laboratories.

load operation the duration of injection and quantity of fuel injected are both reduced so that only part of the air is consumed.

The successful development of this technique required the solution of many problems involving the design and positioning of nozzles, valves and spark plugs. The CFR knock-test engine equipped with the standard variable-compression cylinder and piston unit was selected for the initial work on the new combustion method.

Performance.—Practical operation of this modified engine was achieved. Laboratory tests, made at virtually every condition possible to create on the engines, have proved the soundness of the theory. Knock-free performance has resulted over a wide range of operating conditions.

Compression ratios ranging from 6 to 1 to 12 to 1 have been applied. The latter limit was imposed by the particular combustion-chamber design used. Manifold pressures varied from 10 to 120 in. of mercury absolute, jacket temperatures from 212 to 375 F., and mixture temperatures from 90 to 400 F. Speed ranged from 200 to more than 4,000 r.p.m., again limited by test-engine design.

The engine will develop good low-speed torque when fully loaded. At full speed and full-throttle fuel quantity, the dynamometer can be loaded to reduce the engine to low speed, and upon release of load the engine accelerates to high speed. Indicated mean effective pressure has been varied from values of 10 to 20 to more than 400 psi.

Burns anything.—Of particular interest to the oil industry is the great variety of fuels on which the engine has successfully performed over a wide range of operation. These include such extremes as n-heptane and iso-octane spanning the octane-number range from 0 to 100, and alpha-methyl-naphthalene and cetane which rate 0 and 100 cetane numbers respectively.

Also usable are such fuels as alcohol, benzene, kerosine, diesel fuel, tractor fuel, isopentane, and triptane. The only perceptible variation in engine operation in changing from one fuel to another is in power output, which varies with the heating value of the fuel.

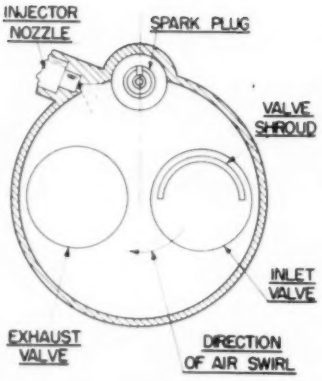
The engine runs at fuel-air ratios of 0.01 to 0.10. Its operation spans the lean-mixture range of diesel engines and the rich-mixture range of gasoline engines, and bridges the gap between the two. It will operate at a mixture too lean for Otto-cycle spark ignition and too rich for practical diesel operation (beyond the smoke limit).

Prospects.—Summarizing, it may be stated that the single-cylinder application of the TCP engine, as tested to date, is competitive with the gasoline engine as regards power output. It is also competitive with the transport diesel engine as to economy. It thus combines the good features of both without the limits on fuel requirements of either.

Should this engine prove to perform commercially, as laboratory tests now indicate, its potential influence on both the automotive and petroleum industries would be far-reaching.

In freeing fuels of the current restrictions which gasoline and diesel engines place on ignition quality, widespread acceptance of this engine, if proved economic, would bring a revolution in the fuel industry.

Aside from the obvious economy involved, there is the conservation of fuel resources which would result from power utilization of an increasing portion of the petroleum barrel. Based on fuels used successfully in the laboratory, it is estimated that the new engine might raise the usable motor-fuel fraction from 54 per cent (diesel fuel plus gasoline) to 71 per cent of crude. This estimate was based on the output of a selected large American refinery.



This sketch indicates the general arrangement of valves, injector nozzle, and spark plug in the TCP engine. Clockwise air swirl is induced by the shrouded inlet valve. Air mixes with injected fuel to form a combustible mixture which is spark-ignited almost instantly. Combustible products continue to swirl behind the flame front to displace air moving into the combustion zone.

Platforming Report

Old Dutch Refining Co. says uniform high-octane product with high lead susceptibility being made; demand is up

George Weber

MUSKEGON, Mich. — Refiners and natural-gasoline manufacturers have been looking forward to results of the practical application of the so-called platforming process ever since it was announced by Universal Oil Products Co. last April.

The first commercial installation of a platforming unit is in the plant of Old Dutch Refining Co. here, and after 4 months of operation the company reports highly satisfactory results on yield and quality of product.

Platforming, which takes its name from the platinum catalyst employed, is designed to improve straightrun or natural gasolines. Pilot-plant studies indicated it would give a large gain in octane number with low loss of volume, and would have moderate installation and operating costs. These promises made the process particularly interesting to smaller refiners.

The Old Dutch refinery has a rated crude-processing capacity of 4,500 bbl. per day. It employs two-stage crude distillation, thermal cracking in a unit with capacity of 1,000 bbl. per day, and conventional polymerization and treating facilities. The new platforming unit replaces a thermal reformer with capacity of 800 bbl. per day.

Performance. — Charging variable mixtures of Michigan straightrun gasolines and naphthas at rates representing partial and full-design capacity, the new unit has produced a uniform high-octane product of high lead susceptibility, and with low volumetric loss.

In western Michigan, where research octane ratings average 83 for regular and 88 for premium motor fuels, this small independent refiner now experiences no difficulty in substantially bettering the market average on octane by blending straightrun, thermally cracked, and platformed stocks. With operations geared to take care of a strong regional demand for burning oils, the company now finds its stocks of gasoline reduced to working levels by the increased demand. Gallonage during January was reported about 16.5 per cent over that of the same month last year.

To meet the growing demand for its motor fuel, the company is augmenting its own feed stocks for platforming, with straightrun gasolines and naphthas contracted and purchased from three other local refiners. The company anticipates operation at full design capacity provided sufficient charge stocks are made available.

The process.—The platforming process reforms virgin, full-boiling-range gasolines and naphthas by means of three controlled reactions. Naphthenes in the charge stock are dehy-

drogenated to aromatics, high-boiling paraffins are cracked to yield lower-boiling paraffins, and low-boiling paraffins are isomerized. As in the hydroforming process, its reactions take place in an atmosphere rich in hydrogen.

Unlike hydroforming, however, platforming is a nonregenerative process, employing hydrogen to suppress carbon deposition on the catalyst. Old Dutch reports no indication of catalyst deactivation to date. Charge stock is processed on a once-through basis.

Full details on platforming and its operation at Old Dutch will appear in The Oil and Gas Journal following the annual meeting of Western Petroleum Refiners Association at San Antonio March 27-29, where platforming will be a featured topic of discussion.

New Logging Method

Simultaneous gamma and neutron readings from single run in the well is claimed for new instrument by inventors

Charles J. Deegan

A NEW radio-active well-logging method, which it is claimed gives both a gamma ray and a neutron log from one instrument in a single run in the hole, has been developed by Perforating Guns Atlas Corp., Houston, according to Paul Charrin, president of the company.

Charrin pointed out that both a gamma ray and a neutron log could be obtained without increasing the cost of drilling rig time over that now required by conventional radio-active methods to obtain a single log, either gamma ray or neutron. Rigging up time to prepare for logging, speed of running the log, and time tearing down equipment and clearing the rig floor are claimed to be about the same for the new dual log and the conventional single log.

In comparison with the time required to obtain both a gamma ray and a neutron log on the same trip to the well by conventional methods, there would be a saving of one-half of the rig time consumed in actually running the instrument in the hole and recording the log.

The only patent specifically mentioned in the public notice by Perforating Guns Atlas Corp., is that issued to F. Brons. This seems to be patent 2,220,509, issued in 1940, and apparently refers to measuring the effect of slow neutrons artificially induced in the formation. It is understood that the company has license rights under other patents, but these have not been disclosed at this time.

Claims.—Much of the research work which brought the new instrument to its present stage was directed by Serge A. Scherbatskoy, consulting engineer of Tulsa. Scherbatskoy pointed out the following similarities and differences between the new method and the conventional radio-active logging system:

1. The gamma-ray log result is quite similar in both new and conventional methods, being the result of measuring the natural gamma-ray emissions from the formations in the well.

2. In both systems the neutron-log recording device measures artificial radiation from the formation. This artificial radiation results from bombardment of the formation by a source of radiation within the logging instrument.

3. The neutron-log recording device of the new system measures slow neutrons only (for all practical purposes). In the conventional system, the equivalent recording device measures only secondary or induced gamma rays (for all practical purposes).

Features.—Some of the special features of the new method, according to Scherbatskoy, are:

1. The source of radiation for bombardment of the formation is relatively free of gamma rays. Radiation is obtained by using a polonium-beryllium combination.

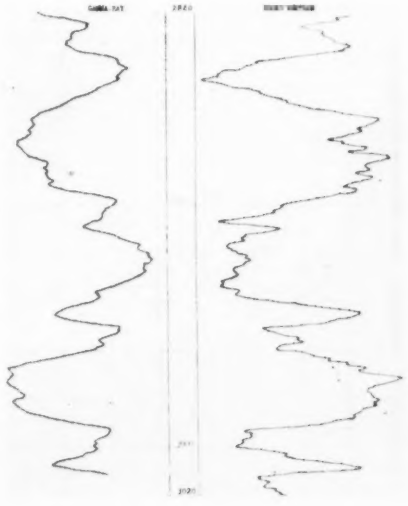
2. By use of a system of shields, the neutrons generated are mainly directed laterally against a comparatively small vertical section of the bore hole. Shielding prevents any of the neutrons generated from passing vertically through any other portions of the instrument which would be adversely affected.

3. The slow-neutron detector and recording system, for all practical purposes, does not respond to gamma rays from the formation, whether they are natural emissions from the rocks or the artificially induced gamma rays resulting from bombardment of the formation by neutrons. The new slow-neutron detector is based on and derived from instruments developed by the Atomic Energy Commission.

4. The conditions resulting from a combination of points 1, 2, and 3, make it possible to separate the natural gamma-ray emission recorder from the neutron bombardment and recording systems by sufficient distance to permit the natural gamma-ray recorder to function without interference from any artificially induced gamma rays. This is all accomplished within a vertical distance of 8 ft. 5½ in.

Significance.—The important thing about a neutron log is that it gives a good clue to the amount of hydrogen present in the formation being logged. For an oil man this is important because the two main sources of high hydrogen content apt to be present in the formation are water and hydrocarbons (either oil or gas). When the formation is bombarded with neutrons, the original neutrons are shot out at high speed. Of all elements that will slow them down and enable them to be recorded as slow neutrons, hydrogen has the most effect.

Scherbatskoy pointed out that direct measurement of slow neutrons affords a better indication of the amount of hydrogen encountered than any other known practical method. Further, he stated, slow neutrons act more like a gas, and tend to diffuse through the formation like a gas before returning to the measuring device. By excluding secondary or induced gamma rays from the measurements, he believes the effects recorded from slow neutrons reflect effects farther back into the formation from the wall of the bore hole than conventional methods.



Reproduction of new-type combination gamma ray and neutron log which was made at the interval 2,820 to 3,020 ft. This was taken February 13 in a well in Dickinson field, Galveston County, Texas. This well is maintained by a large oil company in cooperation with other organizations for the special purpose of running various kinds of tests.

Corrosion Course

Pipe-line engineers acclaim first such course outstanding success; surveys, cathodic protection, coatings covered

Paul Reed

THE first short course ever held on the practical control of pipe-line corrosion proved such a success that before it was over there were demands that it become an annual affair.

Conducted by the Tulsa section of the National Association of Corrosion Engineers February 20-23, the course drew 178 pipe liners from all parts of the country. Opportunities afforded engineers and field men proved so valuable that some predicted the affair may become the nucleus for a new type of organization for the discussion of technical as well as practical phases of mitigating pipe-line corrosion.

The 4-day course dealt with all practical operations of corrosion surveys, cathodic protection, and pipeline coatings. The course consisted of two full days of field work, a day and a half of discussions, and half a day in the plants of equipment manufacturers.

The field trips were to various pipe-line installations in the vicinity of Tulsa and dealt with solution of specific problems, and actual installation of rectifiers and anodes. The group traveled in chartered buses, and a portable public-address system was used to explain the demonstrations.

Cathodic protection. — Current practices in cathodic protection received particular attention.

Within the past 2 years there has occurred a drastic change in the relation of galvanic anodes, represented by the magnesium type, and the application of direct current by means of generators, windmills, or rectifiers through ground beds. In 1948 the galvanic anodes represented only 10 per cent of the applications, and ground-bed types, 90 per cent. Today the situation is reversed, with galvanic anodes comprising 90 per cent of cathodic protection installations and rectifier-bed types 10 per cent. The significance of ground-bed types at certain points where they function more economically for comparatively large current requirements was emphasized in the short course.

The school started with a field test for determining the current required for protecting a coated line laid in 1929. Current was forced into the pipe line from a portable welding generator. Instrument readings determined where potential was raised. In the application of this practical and easy method, data obtained indicated surprising insulating qualities in the old coating.

Even in this test, there were some puzzling problems in connection with insulating flanges on some domestic taps and the manner in which contact of the pipe with a road casing, "hogged the current." With the use of potentiometers and copper sulfate electrodes a typical problem was solved to determine the efficiency of the coating and the amount of current needed for cathodic protection.

Installation of anodes. — In another demonstration, magnesium anodes were installed with two backfilling methods. Various means for determining pipe-to-soil potentials were demonstrated where current leaves a pipe line. All of these were alternating-current methods so as not to be affected by stray currents which might result from local galvanic action or long-line currents.

1. By the four-prong megger method an average resistance of the soil was determined by spacing of contacts. This is often used in the selection of ground-bed sites for rectifiers. This method requires manual cranking.

2. By the four-prong wheatstone bridge with balancer, the same function was performed as with the megger method.

3. A single-prod bar with insulated tip, in connection with an alternating current resistance bridge, measured soil resistance at the depth of the prod tip. The null point was determined with head phones instead of with the customary meter.

The test showed how uniform distribution of anodes has an advantage over grouped installations because of the disadvantage of concentrated grouping which produces an "opposing effect."

Bonding with magnesium anodes was demonstrated, as well as the use of such anodes for protection of points on the pipe near insulated couplings where it is necessary to protect against the effect of imposed currents which jump across an insulated flange.

Rectifier installed. — In connection with the complete installation of a rectifier, all details were demonstrated including those of the ground bed, cables, and the testing of the rectifier's efficiency by dividing the direct current output in watts by the alternating-current input consumption in watts. Rectifiers under 50 per cent in efficiency were termed not acceptable.

At a point where two coated 10-in. crude-oil lines laid by Ajax Pipe Line Co. in 1930 crossed a 6-in. line of Oklahoma Natural Gas Co. a strong current had been imposed on the latter line through an Ajax rectifier operating through a ground bed about 300 ft. from the crossing. It was shown how this could be pervented by installing a resistance bond between the lines that would insure a current drainage on the gas line into the point of bonding so as to insure that current gathered on the gas line would leave by metallic connection to one of the Ajax lines. Resistance required for bond for a permanent installation was calculated.

Instruments demonstrated. — How to use a pipe-line locator to determine the location of low-resistance soil as well as the depth of a pipe line was demonstrated. Most corrosion occurs in low resistance soil. Natural high-negative values indicated by the pipe-to-soil potential methods imply existance of corrosive conditions.

The surface potential method was applied with two copper sulfate electrodes and a high-resistance volt meter or potentiometer volt meter. This method determines flow of current through the soil. When properly eval-

W. E. Huddleston at the microphone explaining the installation of a rectifier during one of the field trips of the short course.

Instructors and officials in charge of the practical pipe-line short course given by the Tulsa section of the National Association of Corrosion Engineers: Earl W. Unruh, Sinclair Refining Co., pipe line department, Independence, Kans.; James R. Cowles, Oklahoma Natural Gas Co., Tulsa (in charge of magnesium anode field work); F. E. Pyeatt, Jr., Mid-Continent Pipe Line Co., Tulsa (field test sites); Robert L. Bullock, Interstate Oil Pipe Line Co., Tulsa, chairman, short course on corrosion; G. E. Baque, Buckeye Pipe Line Co., New York; J. C. Stirling, Stanolind Pipe Line Co., Tulsa; S. R. Merriman, Buckeye Pipe Line Co., New York; J. N. Hunter, Jr., Stanolind Pipe Line Co., Tulsa (rectifier field work); T. D. Williamson, Jr., T. D. Williamson, Inc., Tulsa (publicity); William E. Huddleston, Huddleston Engineering Co., Bartlesville, Okla. (rectifier instructor), who is discussing high-resistance volt meter designed by J. R. Cowles especially for getting quick pipe-to-soil potentials and surface potentials. Absent from the photograph are E. P. Doremus, Cathodic Protection Service, Houston (magnesium-anode instructor) and Frank E. McNulty, Pittsburgh Coke & Chemical Co., Tulsa (coating instructor).

uated it shows where current is entering and leaving a pipe line. This method drew wide interest and is being thoroughly investigated because of its far-reaching possibilities.

Pointers on coatings.—Discussion sessions developed points which promise to be reflected in pipe-line practices. There was a unanimity of opinion regarding the advantages of using kraft paper for getting better coating jobs.

It was pointed out by Robert L. Bullock, Interstate Oil Pipe Line Co., that management is inclined to disapprove the current high wastage allowances of 15 per cent for enamel and 10 per cent for primer, so attention was directed to practices of certain pipe-line companies which curtail consumption of these materials by handling coating as a turn-key job when contracting construction.

To facilitate estimating material requirements, some rule-of-the-thumb methods were exchanged:

1. Quantities of enamel in terms of drums per mile equal 2.5 times the diameter of the pipe in inches.

2. Quantities of primer in terms of gallons per mile equal 3 times the diameter of pipe in inches.

3. To convert weight of kraft paper into squares, using 40-lb. paper, the formula is:

Ream = 2 ft. × 3 ft. × 500 sheets
= 3,000 sq. ft. or 30 squares.

30 squares : 40 lb. :: × squares : 100 lb.

Because of recent advances in cathodic protection, the group was told that a perfect coating protection job is not as important as it was 5 years ago, and was warned against insufficient cleaning and the applying of primers that are too thin.

Plant visits.—How coating and wrapping machines are fabricated was seen in the local shops of Crutcher-Rolfs-Cummings, Perrault Brothers, Inc., and M. J. Crose Manufacturing Co. This gave an opportunity to observe the results of research by these firms for increasing the efficiency of this equipment.

New Process

Higher yields of ethylene from refinery gases seen

HOUSTON.—The important chemical raw material, ethylene, can now be produced from refinery gases containing ethane or propane by a new process which promises advantages over the tubular cracking methods now in use.

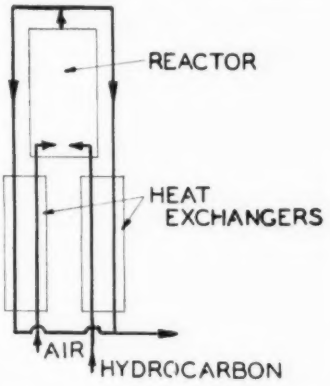
The process was described to the American Institute of Chemical Engineers meeting here this week by R. M. Deanesly and C. H. Watkins of Universal Oil Products Co.

The method is autothermic cracking, a name given to a process in which the endothermic heat used in producing the cracking reaction is offset by the exothermic heat created by combustion which is obtained by mixing air or oxygen with the feed stock. In an ideal system the two reactions balance, and no heat is lost and none need be supplied.

The U.O.P. process has been tested in the company's laboratories at Riverside, Ill. Designs are now being prepared for full-scale plants using various feed stocks and recovery systems. One design is planned to operate with a conventional oil-absorption system, and another design uses a hypersorber to separate a C_2 fraction.

Most of the ethylene now made in this country is produced from propane by tubular thermal cracking. The U.O.P. men believe their process will use ethane as well or better, and give higher yields at lower costs.

The process.—The ideal autothermic cracking process, shown schematically in accompanying drawing, is one in which hydrocarbon and air (or oxygen) pass through heat exchangers



preheated by product gas, reach reaction temperature, are mixed, allowed to react, and then passed back through heat exchangers cooling down to entering-feed temperature. The whole system is insulated to prevent heat loss, and any loss of heat can be compensated by increasing the rate of combustion. Thus no outside source of heat is required.

The U.O.P. experiments found that a temperature above 1,050° F. is necessary to produce ethylene. Pressure in the process may vary, the choice being one of economics; data for 0 to 20 psig. were given.

Significance.—Ethane gas is a by-product of various processes in refineries and natural-gasoline plants, but has little commercial use as such.

Ethylene is an important petrochemical product, with a growing use in the chemical and other industries. It is an ingredient or intermediate for synthetic rubber, synthetic fabrics, rubber accelerators, wetting agents, solvents, toilet-cream bases, emulsifying agents, resins, refrigerants, antifreeze, insecticides, plasticizers, dyestuffs, germicides, plastics, and chemican intermediates.

Phillips Petroleum Co., a large producer of ethylene, estimates that in 1948 the production of this product reached 755,000,000 lb., not including 425,000,000 lb. produced and used at plants making synthetic ethyl alcohol. In 1943 the production of ethylene was only 166,000,000 lb. in the United States.

GULF COAST

Lube Plant Opening

Pure's new Smith's Bluff plant to produce 90,000 gal. of finished stocks daily; more than 1,000 varieties planned

Leigh S. McCaslin, Jr.

BEAUMONT, Tex.—Pure Oil Co.'s new lubricants plant, built at an estimated cost of $20,000,000 to produce 90,000 gal. daily of finished oil blending stocks, was officially opened February 25.

The plant is located adjacent to the company's Smith's Bluff refinery at Nederland, 6 miles southeast of here.

More than 1,000 varieties of lubricating oils and greases will be shipped from the new plant up the Ohio and Mississippi rivers and up the East Coast as far as New York City.

Although canning facilities are available in the new plant, an auxiliary canning plant is being erected at Savannah, Ga.

Pure's new plant consists of six principal units: (1) crude atmospheric and distillation unit, (2) deasphalting and phenol extraction unit, (3) M.E.K. dewaxing, contact filtration, and wax recrystallization section, (4) grease-compounding and blending plant, (5) high-pressure steam generating plant, and (6) 1,160-ft. steel and concrete wharf.

Construction work on the new units has been under way for the past 3 years. At the peak of construction in December 1948, 1,800 men were employed on the project. With the new lubricants plant completed, Pure employs 1,040 men in the entire refinery. This is an increase of 65 per cent over employment before construction started on the new plant.

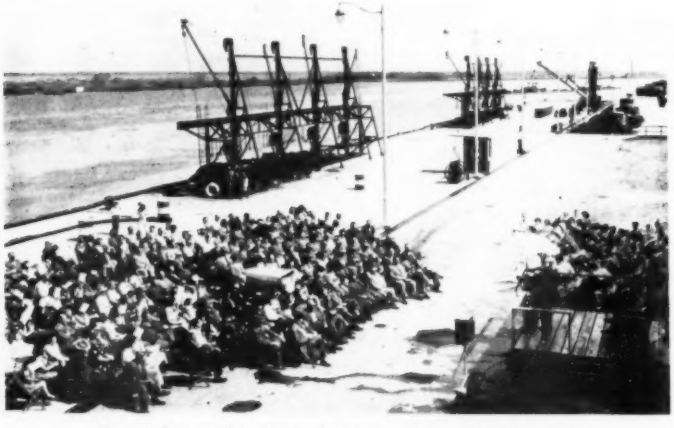
It was necessary to fill in 27 acres of marshland to construct the new plant. To do this, 161,540 cu. yd. of earth was moved to lower ground and 180,000 cu. yd. of river bottom was pumped in. Other interesting construction figures are: 6,540 engineering drawings made; 117 miles of piling driven; 22,200 cu. yd. of concrete, containing 1,950,000 lb. of reinforcing steel, used for foundations; 104 miles of piping erected.

The ultramodern setup occupies 70 acres adjacent to Pure's 26-year-old Smith's Bluff refinery. Crude from the Van field, Van Zandt County, East Texas, is charged to the lubricants unit at the rate of 20,000 bbl. daily. Daily throughput of the entire Smith's Bluff refinery is approximately 60,000 bbl., which makes it Pure's largest refinery. The company operates four other refineries: Cabin Creek, W. Va., 5,500 bbl.; Newark, Ohio, 15,500 bbl.; Midland, Mich., 4,700 bbl.; and Toledo, Ohio, 29,400 bbl.

The Cabin Creek refinery is the only other plant which manufactures lube oils. It refines Penn Grade crude but has an output considerably below that of the new unit at Nederland.

The new lubricants plant was officially opened by C. W. Cooper, refinery manager, and William J. Murray, Jr., chairman of the Texas Railroad Commission. Top company officials from company headquarters in Chicago also participated. These included L. S. Wescoat, president; J. P. Langfitt, vice president in charge of refining; W. J. Arnold, assistant vice president; and W. Dean Kinsell, chief engineer for refining.

A crowd of 3,000 employes and their families witnessed the ceremonies during which Murray presented the new plant with a Texas flag. On Sunday, guided tours were conducted through the plant for the people of surrounding communities.



Part of the crowd at ceremonies opening Pure's new lube plant.

Discovery Study

Humble tops list in South Louisiana with 12 successes

MAJOR oil companies brought in five out of every seven successful wildcats in South Louisiana last year.

A total of 175 wildcats were drilled in 1949 in the area covered by the Houma, Lafayette, Lake Charles and New Orleans districts of the Louisiana Conservation Department. These districts include the offshore leases in the Gulf of Mexico. Of the 175 tests, 70, or 40 per cent, were successful, compared with the nation-wide average of 17.6 per cent.

Of the 70 discoveries, 50 were made by major companies, and 20 by independents and smaller companies. New fields resulted from 39 of the 70 successful wells, with new pay zones in old fields making up the balance.

At first glance, it may seem surprising that the larger companies drilled most of the successful wildcats, as smaller companies are traditionally the "wildcatters." However, South Louisiana is an area of deep drilling and high pressures. Both of these factors increase the expense of drilling operations, accounting for the fewer wells drilled by independents and smaller operators.

Humble Oil & Refining Co. leads the list with 12 discoveries to its credit. Second and third places are captured by The Texas Co. and The California Co. with 10 and 5 discoveries respectively.

The complete list follows:

Humble Oil & Refining Co.	12
The Texas Co.	10
The California Co.	5
Superior Oil Co. of California	4
Shell Oil Co.	4
Kerr-McGee Oil Industries, Inc.	4
Sid W. Richardson, Inc.	2
Union Oil Co. of California	2
Union Producing Co.	2
Gulf Refining Co.	2
Sun Oil Co.	*2
Sohio Petroleum Co.	*2
Union Sulphur Co., Inc.	2
Barnsdall Oil Co.	2
Atlantic Refining Co.	2
Callery & Hurt	*2
Phillips Petroleum Co.	*1
P. A. Ward	1
Magnolia Petroleum Co.	1
Niloco	1
North American Oil Consolidated	1
Cecil V. Hagen	1
Stanolind Oil & Gas Co.	1
Tide Water Associated Oil Co.	1
Continental Oil Co.	1
Danciger Oil & Refining Co.	1
Hunt Oil Co.	1
Hassie Hunt Trust, Estate	1
Pure Oil Co.	1
Marine Oil Co.	1

*Denotes wells drilled in partnership.

Texas-Louisiana Case

Tidelands brief by Perlman says Texas has no valid claim to marginal sea; arguments now set for last week in March

WASHINGTON. — The Department of Justice last week filed the briefs in the Supreme Court on which it will base its argument when the tidelands cases against Texas and Louisiana are heard March 27.

Originally set for hearing February 6, the case was postponed to March 13 and postponed again last week for another 2 weeks.

In the case of Texas, the department told the court the state's argument that all "the vacant and unappropriated lands lying within its limits" were reserved to it in the agreement under which it entered the Union does not apply to the marginal sea, pointing out that the annexation resolution specifically transferred to the United States, among other things, ports and harbors—contiguous to, and merging with, the marginal sea—because of their importance to the national security.

"Since, as the court held in California, the marginal sea is inextricably tied to the defense and foreign affairs functions of external sovereignty, and the state's admission terms were thus drawn so as carefully to preserve these responsibilities and the means of fulfilling them to the United States, it is highly unlikely that the simple reservation of 'vacant and unappropriated lands' was designed to cover the significant area now in dispute," it was contended by Solicitor General Philip B. Perlman.

Not vacant.—Perlman also declared that both the Supreme Court and the Texas courts have long held that the term "vacant and unappropriated lands" normally does not include tidelands or submerged lands "and neither the Republic of Texas nor the State of Texas appears to have included the marginal sea within Texas' public land system, until very recently."

The brief asserted that the Republic of Texas did not have valid ownership or even rightful jurisdiction in the offshore lands but, at most, "a potential, but formant, claim to paramount control and ownership, which a government with national sovereignty might conceivably assert in the future," which passed to the federal Government.

Accordingly, the court was told, if the republic did not have ownership or control of the marginal belt the state cannot claim it as its successor, and if it did have such rights Texas gave them up upon admission to the Union, upon "equal footing" with the other states.

Perlman also attacked Texas' claim to a 3-league belt in view of the conflicting treaties with Spain and Mexico in 1819 and 1828 which were recognized as binding by the Republic of Texas in 1838, but argued also that it would seem to be solely within the province of the federal Government to establish external territorial limits.

Equal footing.—Both Texas and Louisiana, the department argued, are subject to the same principles that the court laid down in the California suit when it held that the 13 original colonies did not acquire ownership of the marginal sea and the "equal footing" clause of the admission statute gave California no greater rights; the United States has asserted and acquired national dominion and control over the marginal sea; protection of the 3-mile belt is a function of national external sovereignty, because of the belt's close relationship to national defense and the conduct of foreign affairs, which are federal powers and responsibilities; and for these reasons, a state may exercise local police-power functions in the part of the marginal sea properly within its declared boundaries but the United States has paramount rights in and power over the area, including full dominion over the resources of the underlying soil.

"These principles are universal in their formulation and application, not limited to the test suit against California and its individual facts," Perlman declared, "and they control the cases of the original 13 and all the remaining states—unless a particular state can show special reason for different treatment."

In the course of its argument, the department went to the 1819 treaty with Spain, which it declared fixed the boundary between the United States and Mexico at the Gulf of Mexico and not 3 miles or 3 leagues from shore.

Tideland Leasing

Louisiana's suspension of activity may end this month

BATON ROUGE. — Louisiana may resume leasing of waters overlying the Continental Shelf, more popularly known as the "tidelands," when the state mineral board meets on March 30.

C. J. Bonnecarre, secretary of the board has stated that "The board has always been ready to lease offshore lands, but this is the first time it will be likely since October 1948."

It was in October 1948 that the federal Government filed suit against Texas and Louisiana for title to the tidelands.

The board secretary said inquiries had been received from oil operators about the Ship Shoal area. Hence, he said, the board would advertise the area for which there are prospects of bids. Ship Shoal area lies off Terrebonne Parish, south of Morgan City, La. It is an area roughly 40 miles wide extending 27 miles out into the Gulf of Mexico.

The exact location of the area in question will not be disclosed until the legal advertisements have been prepared. About 20,000 acres, or four blocks, are involved. The Ship Shoal area is divided into 162 blocks, mostly of 5,000 acres each. It was in this area that Kerr-McGee Oil Industries, Inc., et al., brought in the first producer in the postwar drilling boom off Louisiana.

The land which may be offered for leasing on March 30 will be within 3 miles of shore. It has been noted that the compromise tidelands bill now before Congress provides for full ownership to the 3-mile limit and part ownership from there out.

The interest evinced in the offshore acreage suggests the possibility that at least one oil company believes the compromise bill will pass. Bonnecarre declined to comment on the mineral board's viewpoint on the matter.

There have been a number of rumors going the rounds in Gulf Coast oil circles recently concerning the compromise bill.

ROCKY MOUNTAIN

Jack Named to R.M.O.G.A.

CHEYENNE, Wyo. — William M. Jack, formerly Wyoming secretary of state, has been appointed executive vice president of the Rocky Mountain Oil and Gas Association, Glenn E. Neilson, president of the organization, announced at a director's meeting here last week.

Jack was associated with The Texas Co. for 20 years before entering public life. He also has served as Wyoming state legislator and state auditor.

The following new directors also were appointed: Walter Davis, Casper independent; J. H. Regent, Sun Oil Co.; H. N. Thompson, Amerada Petroleum Corp.; Jack Cole, Ethyl Corp.; Harold Wyatt, Union Pacific Railroad; and H. I. Craig, Bay Petroleum Corp. Merle Morton, Morton Oil Co., who resigned, was replaced by Gordon Kay, new president of the company. H. H. Healy, Ohio Oil Co., was named a member of the executive committee, succeeding Z. K. Brinkerhoff, Jr., who resigned.

IN THE REEF?—This is the Scurry County well which apparently found Canyon reef production where the reef was supposed not to be. It is Progress Petroleum Co. 1 O. R. Buffaloe, 3 miles north of North Snyder field but separated from it by a dry hole. But it has intensified speculation that the fabulous reef connects, by some irregular pattern, with the Cogdell pool in Kent County, 5 miles to the northeast.

New Reef Pool

Wildcat in Cogdell-North Snyder gap gets production

Carl F. Hoot

SNYDER, Tex.—Another new pool for Scurry County seems assured by a well which many geologists and operators had given slight chance of success and at a spot which may cause still another revision in guesses as to the outlines of the sprawling Canyon reef formation.

The probable pool opener and cause of the latest excitement in this West Texas hot spot is the Progress Petroleum Co. 1 O. R. Buffaloe, which topped the Canyon limestone reef at 6,787 ft. On the basis of the first drill-stem test, this well is considered more or less certain to be classed as a commercial producer. *For details of the 1 Buffaloe and the drill-stem test, see the Exploration and Drilling section, page 103 of this issue).*

The Progress 1 Buffaloe is about 3 miles north of the nearest production in North Snyder field and 5 miles southeast of the Cogdell area of Kent County—almost in the middle of an 8-mile gap between the two.

The reason for predictions of failure is that in Section 503, only 2 miles south of the 1 Buffaloe location, the Progress 1 Carden was classified as a failure, although it found about 8 ft. of reef before entering water.

With substantial assurance that it is a pool opener, the well is drilling ahead this week while geologists and operators are attempting to reason out what happens to the reef trend in this 8-mile stretch. The most widespread thought is that the 1 Carden is located on a valley between reef highs. The latest theory is that if the reef is productive of oil in this area the greatest buildup will be found to the west of the 1 Carden.

North of the 1 Carden it is possible that the reef again builds up and broadens, running north through the Buffaloe area and then trending northeast through Cogdell field.

The well now being watched as the key to this possible northeastern trend is Castelman & O'Neil 1 Feldman-Pardo, located 467 ft. from north and west lines, southwest quarter, 651-97 H&TC Survey, or almost directly between the Buffaloe and Cogdell wells. This week the 1 Feldman-Pardo was drilling ahead at 6,484 ft.

MER Substitute

Railroad Commission settles on depth-acreage method of determining allowables, cuts state production for March

Leigh S. McCaslin, Jr.

AUSTIN.—Texas starts March with a new oil-proration formula and a deep production cut which is sharpest in the Gulf Coast and West Texas areas.

The new formula is the result of a Railroad Commission hearing 2 weeks ago at which the governing body indicated a change would be made. At that time three methods were offered by the commission as alternatives to the MER (most efficient rate) method. After study, the commission has decided to return to the "1947 yardstick," which bases production on depth and acreage.

Simultaneously with the announcement of the new system, the commission put all proratable fields in the state on 17 producing days for March. This compares with the February pattern of 13 days for East Texas and 15 days for the rest of the state.

Effect on producers.—With the new formula and 17 producing days, the average calendar-day allowable will drop 92,161 bbl. from the February figure. The formula has the effect of raising production in near-stripper or low-producing fields while cutting production in flush fields. East Texas field, for example, will be allowed to produce 251,394 bbl. daily, an increase of 36,498 bbl. On the other hand, output of the flush Scurry County fields will be almost halved with a slash from 49,860 bbl. daily to 28,887 bbl. The calendar-day producing rate for Scurry wells will be 65 bbl. per well as compared to 111 bbl. in February.

Table showing permissible daily production under the newly adopted formula:

Depth	10 acres	20 acres	40 acres
0- 1,000	18	28	
1,000- 1,500	27	37	57
1,500- 2,000	36	46	66
2,000- 3,000	45	55	75
3,000- 4,000	54	64	84
4,000- 5,000	63	73	93
5,000- 6,000	72	82	102
6,000- 7,000	81	91	111
7,000- 8,000	91	101	121
8,000- 8,500	103	113	133
8,500- 9,000	112	122	142
9,000- 9,500	127	137	157
9,500-10,000	152	162	182
10,000-10,500	190	200	220
10,500-11,000		220	220
11,000-11,500			260
11,500-12,000			260
12,000-12,500			280
12,500-13,000			280
13,000-13,500			300
13,500-14,500			300

The average calendar-day allowable for March will be 1,944,122 bbl. as compared with 2,036,283 as of February 18. This is the lowest figure since July 1949. Adding an anticipated 293,152 bbl. daily of natural gasoline and distillate production to the crude allowable gives the state a total liquid-hydrocarbon output of 2,237,274 bbl. daily. This is 137,274 bbl. daily higher than the Bureau of Mines forecast.

Under the new system, fields which have been exempt from proration will continue to be. Also, the discovery allowable, which is an incentive for wildcatting, remains in effect. The MER of the various fields will still be used to the extent that it will be a ceiling on production. If, for example, an individual field's flow under the 1947 yardstick should exceed the

MER, it would be reduced to the MER.

Some of the major changes, by fields, in barrels daily:

	February	March
District 3:		
Chocolate Bayou	4,935	3,721
Hastings	32,231	28,373
Oyster Bayou	6,632	2,455
Smith Point	1,900	650
Stowell	6,294	4,903
Thompson	19,883	7,172
Webster	29,538	10,054
District 5:		
Sherman	2,883	1,506
Van	18,874	9,734
District 6:		
Hawkins	25,957	21,384
District 7-C:		
Todd Deep-Ellen	6,175	3,216
District 8:		
Abell Silurian-Mont	1,551	675
Andector-Ellen	11,979	6,015
Scurry (all)	49,860	28,887
Foster	14,806	10,816
Martin-Ellen	5,954	3,413
TXL-Ellen	23,216	14,320
TXL-Devonian	11,644	7,290
Yates	26,811	21,318

March allowable, by Railroad Commission districts, with change from February 18, in barrels daily:

District—	March	Change
1—Southwest	28,267	+142
2—Southwest	115,327	+1,424
3—Gulf Coast	330,159	—52,238
4—Southwest	189,318	+1,428
5—East Central	23,633	—10,140
6—Eastern	79,251	—4,497
6—East Texas field	251,394	+36,498
7-B—West Central	73,287	+17
7-C—West Central	47,375	—3,813
8—West Texas	544,409	—60,639
9—North Texas	159,719	—287
10—Panhandle	101,983	+4
Total	1,944,122	—92,161

Explanation.—In explaining how the March producing rate was obtained, Commissioner Ernest O. Thompson said: "We have added up the amount of oil that it would take to give each and every well in the state an amount of allowable in oil each day equal to the statutory allowable for wells of that depth. We have added to this the amount of oil that is necessary to reward the new discoveries now receiving such reward, plus the amount of oil required to keep in production the wells in the fields which have been proven to be deserving of exemption from shutdown because of physical waste.

"The total was then subtracted from the market demand as found by the commission, and the difference between the market demand and the figure given furnished us with the amount of proratable oil over and above the amount heretofore listed."

In summary, Thompson said "we have followed the standards which are set up by law below which we must not go, and have followed the natural laws in never exceeding the maximum efficient rate of any field, and have divided fairly and ratably among the fields that can produce more, their fair share of the proratable balance."

Reef Fields Shut In

The Texas Railroad Commission February 27 issued an order shutting down all Canyon reef-producing wells in Kelley, Diamond "M," Sharon Ridge, Canyon and North Snyder fields of Scurry County.

Shut-down will run from March 18-26, at which time all operators are to run bottom-hole pressure tests. It is the commission's intent to shut the wells in 8 days before testing and to keep them shut in until the commission has completed a bottom-hole pressure survey of every well.

It was reported that bottom-hole pressures in some areas of these reef producing areas have dropped as much as 7 psi. per day.

Thompson warned that the market demand for oil is shrinking so fast that the time may soon come when every Texas well will be limited to its statutory marginal allowance. The most disturbing factor in the market, he believes is "the tremendous amount of gasoline on hand—129,362,000 bbl."

The next state-wide oil hearing will be held March 16 in Fort Worth.

Imports Resolution

AUSTIN.—The "citizen committee" recently appointed by Railroad Commission Chairman William J. Murray, Jr., to study imports adopted a resolution at its first meeting criticizing current imports as "excessive and contrary to the best interests of our state and nation."

On the motion of Joe T. Steadman, Brotherhood of Railway Trainmen, the committee voted to establish a permanent organization to carry on its purpose and aims, to be known as the "Statewide Citizens Economic Committee."

Murray, in a welcoming address to the committee members, said that the oil-import problem has ceased to be one affecting only one industry. The time has arrived, he stated, when citizens of all walks of Texas life must make known their feelings on a matter which is undermining not only the independent segment of the oil industry, but jobs of thousands of Texans and income of the state government.

Salt Dome Liquidating

HOUSTON.—Salt Dome Oil Corp. has submitted to its stockholders a plan to liquidate its assets and go out of business.

The company's largest asset is a one-half interest in leases in Cedar Point field which is operated by Standard Oil Co. of Texas, and Standard has the right to call on Salt Dome's shares of the production. Salt Dome proposes to convert this into a perpetual overriding royalty and create a trust for its stockholders. Standard will purchase Salt Dome's equipment in this field.

The rest of the company's property will be sold for $800,000 to Salt Dome Production Co., a firm organized for the purpose by K. F. Hasselmann, president of Salt Dome Oil Corp. The notice to stockholders states that no other officer or director of the corporation has or expects to have any interest in Salt Dome Production Co.

The notice explained that aside from Cedar Point, the company's producing leases and royalties are in varying stages of depletion and its nonproducing leases are of speculative value. It owns a drilling barge which has been used for contract drilling but the statement said this activity is not of a permanent nature.

INDUSTRY AFFAIRS

Pension Interest

Sinclair declines to amplify union statement on contract

THE new pension and sick-benefits plan negotiated between Sinclair companies and the Oil Workers International Union (C.I.O.), described in The Oil and Gas Journal last week, has aroused interest throughout the oil industry, particularly since the union has stated that this may become the pattern for its objectives in dealing with other oil companies where it has bargaining units.

Requests for details of the plan have come from numerous sources but company officials decline to amplify the union's description of the plan until it has been approved by company stockholders and union members. However, an announcement has been made to employes by P. C. Spencer, president of the parent Sinclair Oil Corp., in which he said:

"This is to announce that plans have been formulated which, subject to approval by stockholders of the corporation and subject to certain other contingencies which must be met, will liberalize the provisions of the employes' retirement allowance plan of Sinclair Oil Corp. and its designated subsidiaries.

"Among other things, the proposed amendments to the existing retirement plan will reduce eligibility requirements so that employes having 5 years service may become participants at age 25 and will also provide for a minimum annuity of $125.00 per month to participants at age 65 with 20 years or more of service. This minimum monthly annuity is depend-

ent upon the time and the amount of the contemplated increase in federal social security benefits.

"The complete program, which adequately covers our employes and which is reasonable from the standpoint of company expense, also includes an insured employes benefit plan which, if finally approved and adopted, will provide paid sick leave for employes together with liberal allowances for hospital, surgical, and medical expenses incurred by participating employes and their dependents.

"It is hoped that all conditions pertaining to the adoption of the foregoing may be satisfied so that the combined plans may be made effective in July 1950."

NATIONAL AFFAIRS

Rubber Outlook

Administration's plan for 10-year control of synthetics facilities gets icy reception before committee hearing

WASHINGTON.—There is likely to be little change in the status of synthetic-rubber facilities for the next 3 to 5 years.

The administration's request for new legislation ran up against strong opposition from the Armed Services Committee and representatives of industry last week during hearings before the committee.

Department of Commerce officials urged enactment of President Truman's program under which the Government might dispose of the facilities over the next 10 years but would retain rigid control over their operation.

Both rubber manufacturers and representatives of the oil industry opposed the measure, as did Rep. Carl Vinson of Georgia, chairman of the committee.

Vinson declared the present law, which expires next June, worked all right, said he favored 3 to 5-year extension, and asserted the Government should retain the plants so long as the United States is engaged in a cold war.

Administration view.—Vinson's statement flatly challenged Commerce Secretary Charles Sawyer, who told the subcommittee the administration recommendations were based on national security, "with due regard to our international arrangements and to the position of private industry in this country."

"What we must have at all times in addition to an adequate stock pile of natural rubber, as provided for in the Strategic and Critical Materials Stockpiling Act," Sawyer said, "are the means to assure a flow of synthetic rubber from a rapidly expandible source at home when it is needed. To achieve this we must be in a position to require that a minimum of certain types be produced and consumed. The point has not yet been reached for these types of synthetic rubber where we can rely on voluntary use to provide a minimum of security, though we hope this situation will change as the result of further technological improvements. There must be sufficient facilities in the United States to increase this supply just as fast as is required.

"The administration believes that an adequate disposal plan has now been developed and that disposal can be undertaken; such disposal to include guarantees for national security. We believe that ownership of the synthetic rubber plants by private industry, with the resulting product promotion and healthy competition characteristic of American industry, should result in a great stimulus to advancement toward the goal of a self-sustaining synthetic rubber industry."

Oil's opinion. — The administration's defense claims, as well as assertions that the disposal program would enable small companies to purchase the synthetic rubber facilities, were also challenged by R. C. Jopling, vice president of Phillips Petroleum Co.

Jopling declared the rubber supply situation now is more critical than at any time since Pearl Harbor, pointing out that 80 per cent of the world production of natural rubber is in Malaya and Indonesia, directly in the line of the advance of communism.

He said the country should begin to build a large private synthetic industry that eventually will be able to stand on its own feet in competition with the rubber industry of the world, but asserted the administration proposals would foster monopoly by the "Big 4" rubber manufacturers and would make it possible for small companies like Phillips to acquire plants.

Rubber's view. — Representatives of the rubber manufacturers also opposed the President's bid for broad discretionary powers over the rubber program and asked that Congress keep control in its own hands. They joined with Vinson in the belief the present law should be extended for 3 to 5 years, but suggested some revisions.

These revisions would assure production and comsumption of synthetic in amounts equal to or greater than the minimum now required for security reasons; provide for retention of capacity equal to that now provided; make provision for adding certain "pipe line" stocks of synthetic to the rubber stockpile for use during the period required to reactivate stand-by plants in an emergency; open the way for more private research by permitting plant operators to make test runs in copolymer plants without first disclosing the facts of their discoveries to the government; and set up procedures to test the capacity of synthetic rubber to stand on its own feet in world markets without impairing security.

Sterling-Dollar Doubts

Washington officials hopeful, but close British election puts damper on prospects; Britons stand firm on program

WASHINGTON.—With the British election out of the way, Washington officials are hopeful of progress in settling the dollar-sterling oil controversy, one of three major differences between the United States and Britain.

Whether this hope would become a reality, however, was subject to doubt in view of the thin margin by which the Labor Government was returned to office, and the possibility that another election may have to be called within a few months.

Executives of oil companies operating abroad met last month with members of the British oil delegation for a discussion of the order restricting imports of dollar fuel oil and gasoline into the sterling area, and this week or next are expected to meet again with State Department officials who are attempting to work out some sort of platform on which to stand when the Anglo-American talks are resumed.

The oil men reportedly received little comfort from their talks with the British officials, at which they were given a thorough understanding of the order and the definite impression that Britain is determined not to recede from its position. There is a general belief in Washington that a satisfactory settlement of the issue will not be reached quickly or painlessly.

No alternatives.—The British position is that they can think of no alter-

natives to the program they worked out to supplant dollar with sterling oil. So far American officials have been unable to suggest any workabe arrangement, although it is rumored some of the oil-company men will have some ideas to lay before the State Department. The United States position is that the British action will benefit nobody but their own oil companies, by crowding the American companies out of competition, and that some way must be found to safeguard the latters' interests.

The issue now has become two-pronged. To the avowed purpose of the British to cut the drain on their dollar exchange by using sterling oil has been added the disposition of the surplus production of the British companies. So far nobody has come up with any formula which will provide for the liquidation of the sterling-oil surplus in such way as to leave markets for dollar oil. There were no indications in the statements of either Secretary of State Dean Acheson or Economic Cooperation Administer Paul G. Hoffman before the Senate foreign relations committee that any definite policy with respect to oil has been developed.

Expressing the belief that British-American economic talks may now be speeded up, observers here pointed out that ever since the monetary discussions last September negotiations have slowed more and more. To considerable extent this is attributed to preoccupation of Labor Government leaders with the coming election, and to that campaign also is attributed much of the stubbornness of British negotiators who came to Washington to settle the oil and other problems.

Washington inactive. — At the same time there is some feeling that our own officials have been less energetic than they might have been, possibly because they were attempting to evaluate new problems that might be dropped in their laps as soon as current ones were disposed of. Possibly these might be an appeal for aid from the United States in meeting Britain's indebtedness to the sterling countries which is a drain on both her sterling and dollars, or a move to get American help for southeast Asia which has a monetary problem that engaged the attention of the Colombo conference of Commonwealth foreign ministers.

Whatever the reason, the two governments have reached a stalemate, not only on oil but on closer economic association of Britain with continental Europe and other phases of the general economic problem.

While the date for resumption of the oil talks is still indefinite, it is expected the British and United States delegations may meet sometime in the next week or two, the exact time depending on when the State Department completes its consideration of the information, arguments, and suggestions to be laid before it by the oil companies.

WATCHING WASHINGTON

Bertram F. Linz

Co-op Taxes

To tax or not to tax cooperatives became a live issue in the House ways and means committee last week.

Appearing for affirmative were spokesmen for business and trade associations who held out the tempting bait that by taxing the co-ops the committee could raise up to $1,000,000,000 as the "offset" demanded by President Truman for any cuts in excise taxes.

For the opposition, the co-ops themselves stressed the many advantages their system of operation give their members and launched a bitter attack at the "big business" which made their existence necessary.

Assailing "subsidized competition," association witnesses said the cooperatives are doing a business of $17,000,000,000 a year and asserted that the conditions under which they originally were exempted have changed and there now is no reason why they should enjoy tax benefits.

Originally conceived as a means of enabling farmers to supply their needs cheaper and to provide an efficient marketing organization, the co-ops were given tax exemptions on that basis. But now, it was charged, they have gone far beyond the original intent of the law, engaging in production and processing in competition with tax-paying enterprises.

Both sides talked well and effectively, but there was no indication that the committee would take any action on the issue, which is loaded with political dynamite.

Sterling Lures

Loss of more markets for dollar oil appears to be more than a mere possibility, as Latin American countries suffering from lack of dollar exchange turn their thoughts to the advantages of joining the sterling area.

Reports recently reaching Washington disclose that Chile is considering, if not already talking to Britain about, the possibility of securing a sterling credit as the springboard for expanding her trade with the sterling countries. Chile could take sterling oil and other products, in turn selling more of its exportable goods for sterling.

The precedent for joining the sterling area was set, of course, by Argentina, which entered into an agreement with Britain last year for the exchange of goods. Argentina prides itself on being the economic leader in Latin America, and its deal with England has been followed with interest by other countries, which now see some sort of tie-in with the sterling area, but one which will avoid the disadvantages of the Argentine-British deal, as a way out of their financial difficulties.

But although Argentina cold-shouldered American oil to make its deal with England, all is not rosy in the Peron empire and there is a good chance that in the near future Argentine emissaries may be asking the United States to bail their country out. Even with the British agreement, Argentina buys a great deal of goods from the United States. On the other hand, Peron's demand for above-world-market prices for Argentine products has kept exports to us down, and he could use an advance of a few hundred million in dollar exchange.

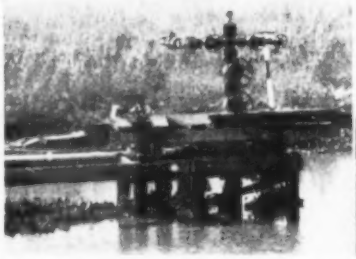
ITO Fades

The administration continues to plug for ratification of the International Trade Organization charter, but in some government circles officials privately express the belief the whole effort to eliminate barriers to international trade is a washout—its chance killed by British trade policies.

These officials point out that the British Government has never accepted the ITO charter. They point out, too, that British exchange controls, restrictions on the import of dollar oil, and the bilateral agreements by which they are forcing American companies out of important markets are all in direct contravention of the objectives of the proposed U. N. trade organization.

There is a growing feeling that even if the ITO were set up it would lack not only authority but even influence in bringing about the elimination of trade barriers.

The administration plans to go ahead with its effort to secure approval from Congress, and congressional leaders are expected to go down the line for the ITO, but there are a number of members who are skeptical of the wisdom of voluntarily shackling the United States to policies which at best will receive only lip service from other countries, and the legislation may be another of the many tests of strength between administration and antiadministration forces which are piling up in Congress.



HIGH-PRESSURE STUFF.—Enough pressure to blow a skyscraper 50 miles into the air is being held in by this peaceful-looking christmas tree near Bayou Penchant in the south Louisiana marshes. That is the calculation of Dr. R. E. Baker, area gas manager in New Orleans for Shell Oil Co., based on the hypothesis that the pressure could be put into a gun with the building as the projectile.

The well is Shell's 1 Continental Land & Fur Co., in Terrebonne Parish, a gas-distillate discovery with a flowing tubing pressure of 8,000 psi. This is the highest pressure yet found in an area noted for high-pressure wells. To handle it, the gas-distillate is reduced in pressure during its journey up the well bore by three reducing regulators in the tubing, so that the pressure is only 3,500 psi. at the well head. In the pay formation, 2 miles below the surface, the gas has a temperature of around 235° F.—23° hotter than the boiling temperature of water. But if allowed to expand rapidly it would cool itself to more than 100° below zero Fahrenheit. During testing operations the gas-distillate was reduced from 3,500 psi. to the gas-separator pressure of 215 psi., which chilled it so that ice ¾ in. thick formed on the piping, as shown in the picture at right.

ASSOCIATIONS

Production Meeting

DALLAS.—Subjects of primary interest to southwestern production men will be featured at the spring meeting of the Southwestern District of the American Petroleum Institute's Division of Production.

The meeting will be held in the Adolphus Hotel March 8-10.

Principal technical papers will include:

"Geological Interpretation of Dip-Meter Results," A. P. Claudet, Schlumberger Well Surveying Corp., New Orleans; "Factors Affecting the Rate of Penetration of Rock Bits," George E. Cannon and W. J. Bielstein, Humble Oil & Refining Co., Houston; "Lime-Base Muds—A Report of the 1949 A.P.I. Southwestern District Subcommittee on Drilling Fluids," Preston E. Chaney, Sun Oil Co., Beaumont, and Jack L. Battle, Humble Oil & Refining Co., Houston; "The Use of Meteorology in the Oil Industry," Joe E. Graham and Richard A. Geyer, Humble Oil & Refining Co., Houston; "Homogeneous Permeability Study," Ralph F. Nielsen, Pennsylvania State College, J. J. McMahon, Shell Oil Co., Corpus Christi, J. G. Heid, Continental Oil Co., Ponca City, and S. T. Yuster, University of California; "Gas-Oil-Ratio Repair and Control in West Texas and New Mexico," T. B. Lambert, Shell Oil Co., Odessa, and R. M. Hippard, Shell Oil Co., Hobbs.

Equipment Men Meet

LOS ANGELES.—Members of the Pacific District of Petroleum Equipment Suppliers Association have scheduled an afternoon and dinner meeting in the Ambassador Hotel here March 9 to enable the heads of all departments of member companies to become acquainted with the activities and aims of the association.

Discussions will be led by J. A. Crawford of Youngstown Steel Products Co. of California, and Ted Sutter of Baker Oil Tools, Inc.

MID-CONTINENT

Oklahoma Cuts Allowable

OKLAHOMA CITY.—Oklahoma per-well allowable has been reduced 10 per cent for March by the state corporation commission. Total production will remain approximately the same as February's 407,273 bbl. daily, with the decrease in allowables expected to be made up by new well production.

Walker T. Pound, conservation director, in recommending the cut, explained that it would reduce total production by about 21,000 bbl. daily, but that present completions were adding from 15,000 to 16,000 bbl. daily.

Pound, at an operator's conference preceding the hearing, had originally favored a 20 per cent reduction but softened to the lower figure in deference to protests by several operators who recommended the 10 per cent reduction.

Companies favoring the 10 per cent reduction included Magnolia Petroleum Co., Mid-Continent Petroleum Corp., Carter Oil Co., Continental Oil Co., and Rock Island Refining Corp. Sinclair Oil & Gas Co., Shell Oil Co., and Wilcox Oil Co. favored "freezing" the per-well allowable at the February rate. Stanolind Oil & Gas Co. recommended a 20 per cent slice.

Kansas Figure Unchanged

WICHITA.—March crude oil allowable in Kansas has been set at 270,000 bbl. daily by the state corporation commission. This remains unchanged from the January, February figure.

T. A. Morgan, conservation director, reported nominations of crude purchasers totaled 282,846 bbl. daily for March, down 4,523 bbl. daily from February.

NEXT WEEK

Plant Size.—Effect on cost . . . The "six-tenths" factor . . . Data on 19 process plants of different capacities.

A Piece of Pipe.—Why specifications? . . . Refinery engineer discusses properties, refinery applications, in practical-use article.

World's Largest Drilling Barge.—Picture story of South Louisiana operation.

Flow of Gas.—Pipe-line engineer gives calculations accounting for deviation from ideal gas laws.

Permian Basin.—"Know-how" article on acidation for this large area.

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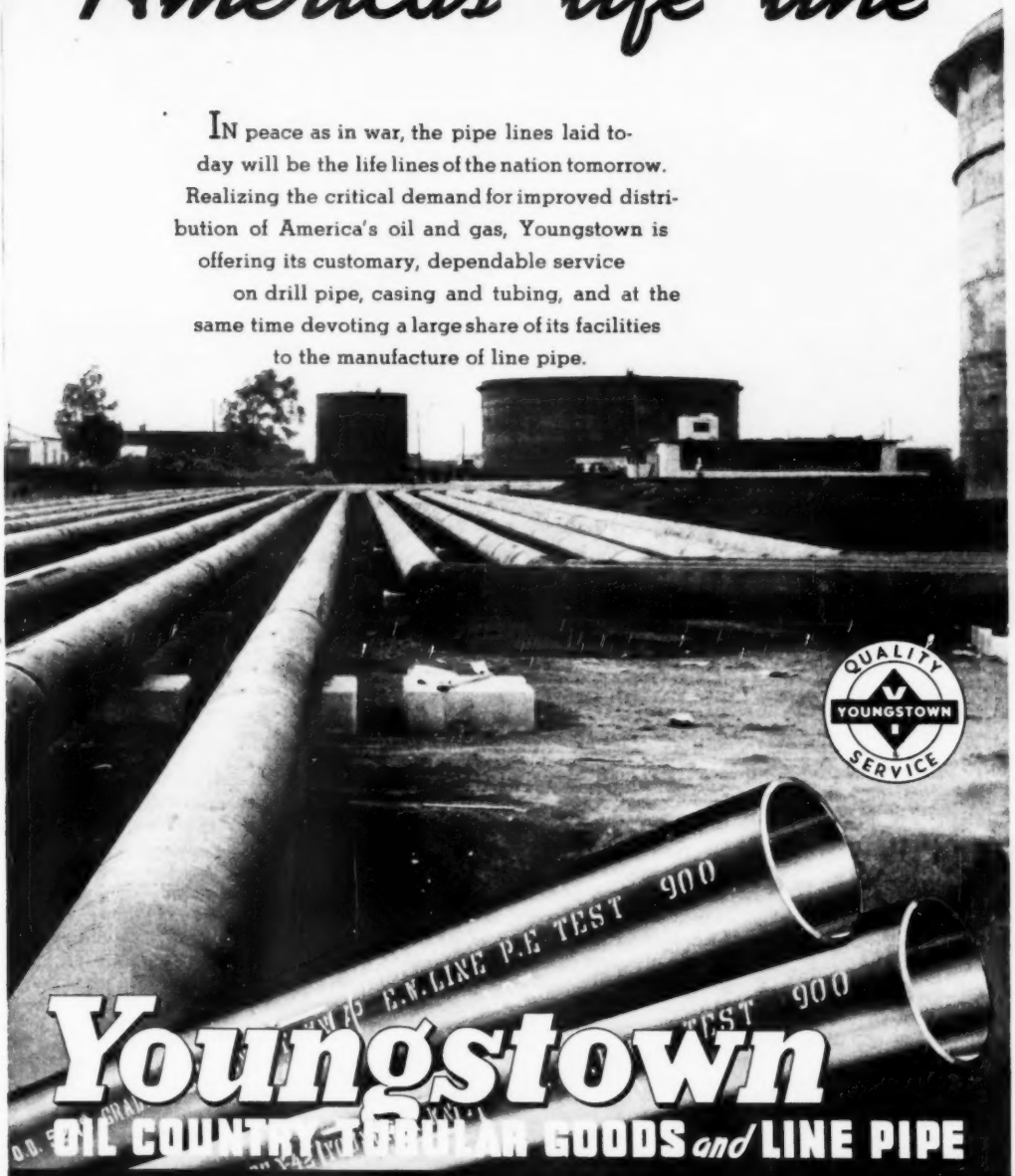

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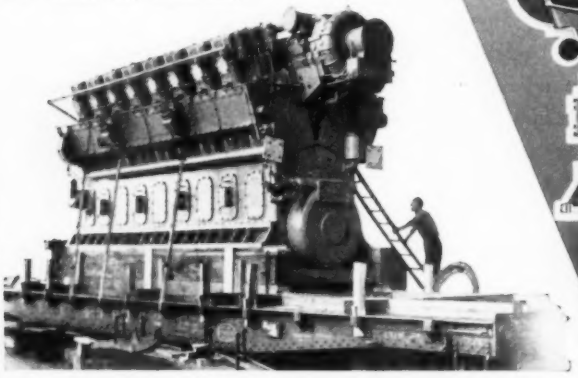
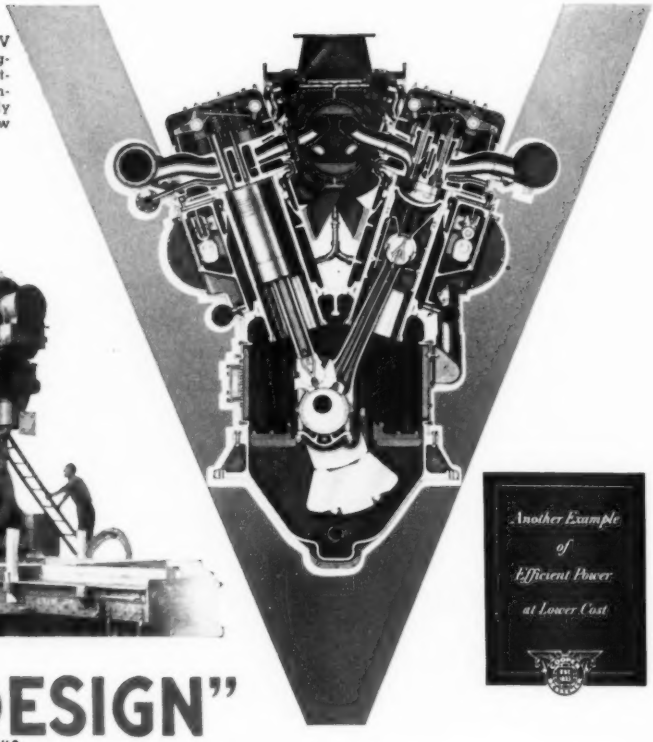
RIGHT: cross-section of Cooper-Bessemer LSV diesel (15½" bore, 22" stroke) showing rugged, compact design and articulated connecting rods. Features include, large 13½" diameter counterbalanced crankshaft, unusually low bearing pressures, and exceptionally low head room.

BELOW: Cooper-Bessemer 16-cylinder LSV engine, rated 3,400 hp at 327 rpm, mounted on flat car ready for shipment. As shown, complete factory-tested engine can be shipped as a unit without any disassembly.





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LATIN AMERICA

Public Relations

Colombian engineer proposes cooperative program which would boost oil companies' stock with Latin Americans

A PROPOSAL for the establishment of an oil-industry information bureau to serve Latin America was laid before officials of several oil companies in New York recently by Edward Ospina-Racines, consulting engineer of Bogota, Colombia.

His plan contemplates a cooperative company program to disseminate information about the oil industry to the public, government officials, students, and others in Latin America. "If the industry needs a public-relations program in the United States, they certainly need it as badly abroad," he said. "From Patagonia north, there is a tendency to wave the red flag when anything about oil is mentioned."

Ospina-Racines reported that initial reception to his proposal was favorable among officials of the various operating companies he met in New York. He is returning to Bogota to draw up more detailed plans for such an organization.

Ospina-Racines, a Colombian educated in the United States and in France, is editor of the Colombian Oil Digest and author of a recent study on the economics of the international oil trade. He was formerly with the Colombian Ministry of Mines and Petroleum, serving as oil adviser to the consulate in New York from 1935 to 1939.

Effort in Brazil.—Of interest in connection with efforts of the industry to improve its public relations in Latin America is the advertising campaign being conducted in Brazil by Standard Oil Co. of Brazil.

In Brazil, foreign participation in producing and refining has been prohibited by a decree law for more than 10 years. Some changes are provided under terms of a proposed law which has been pending about 2 years. The issue has been the subject of a major political controversy.

Standard of Brazil, an affiliate of Standard Oil Co. (N. J.), set forth its position in a series of seven advertisements. The program is to be continued with other advertising explaining the company's investment policy and other information.

Should satisfactory legislation be enacted allowing foreign capital in producing and refining, Standard of Brazil said it would be ready to take its part, preferably in association with Brazilian interests. However, the company said that allegations it had fostered or supported the new law were incorrect. From what is known of the law, the company said it did not believe it or any other commercial enterprise could successfully operate an oil-producing venture under its provisions.

The company put across a number of basic facts about the oil industry in a question-and-answer series. One of these brought out that its net profits were less than 7 per cent. Another pointed up the tremendous investment required before significant oil is discovered and developed. Other parts of the advertisements stressed that the welfare of Standard of Brazil was tied to that of the country, with which it had been identified for 37 years.

Venezuela Review

Refinery operations up 21.8 per cent over 1948

VENEZUELA'S refineries last year processed nearly 53,000,000 bbl. of crude, which represents a throughput increase of 21.8 per cent over the previous year, according to data compiled by the Government's Ministry of Fomento.

The 1949 throughput is equivalent to about 145,000 bbl. daily. Crude processed the first 11 months amounted to 47,851,313 bbl., and December was estimated.

The ministry's statement pointed out that last year 10.99 per cent of the country's production was processed in its domestic refineries. This percentage in 1948 was 8.88, and in 1947, 8.46.

Operations at the new Cardon refinery of Shell accounted for the gain in Venezuelan refinery throughput last year. Larger increases will come this year. Creole Petroleum Corp.'s Amuay Bay refinery went on stream in January; the Gulf-Texaco and the Sinclair plants are under construction at Puerto la Cruz.

With the completion of these projects, along with the newly announced Phillips Oil Co. refinery in Eastern Venezuela, total refinery capacity in Venezuela is expected to total more than 275,000 bbl. daily. Construction of these plants results chiefly from the requirement imposed on operators in 1943 to refine in the country one-tenth of production from new concessions.

Of the production from refineries in Venezuela in 1949, an estimated 36,995,000 -bbl. was exported. This represents an increase in products exports of 17.9 per cent over 1948, according to the ministry figures.

Venezuelan crude production for the year was 1,321,367 bbl. daily, down 17,423 bbl. daily, or 1.3 per cent, from 1948, the ministry said. Total exports of crude for the year, including estimated December liftings, were 423,233,705 bbl., a decrease of 14,450,644 bbl., or 3.3 per cent, from 1948. The 1949 total was, however, 6.7 per cent greater than 1947.

The ministry's review listed seven new fields of significance discovered last year. They were: State of Guarico, San Roque, Taman, Ruiz, and Punzon; State of Zulia, Macoa; and State of Angoategui, Freites and Inca.

Colombia's Oil Revenue

Revenue received by the Colombian Government last year from operators of the oil industry amounted to Ps. 21,874,467.32, or approximately $10,930,000, according to a report of the Ministry of Mines and Petroleum.

This represents about 37 cents (U.S.) per barrel when related to the 1949 Colombian production of 29,707,431 bbl. Royalty made up most of the revenue with Ps. 5,449,070.35 resulting from De Mares production and Ps. 4,099,657.99 from Barco. The consumption tax on motor fuel, lubricating oil, and greases yielded Ps. 9,517,417.42.

Mexico's Petroleum Future

Mexico was given assurances of a healthy long-term petroleum future in talks made by officials of Petroleos Mexicanos at the opening sessions of the organization's first technical conference in Mexico City.

Manuel Rodriguez Aguilar, exploration manager for Pemex, and Alfonso Barnetche, production manager, said there was no reason for alarm about the country's position in regard to oil. "The position of Pemex, as far as oil reserves are concerned, is perfectly solid," they said. "The potential wealth which we know is locked in the bowels of the earth gives assurance that the life of our industry is certain for many generations."

The two Pemex officials estimated Mexico's proved reserves at 1,270,000,000 bbl., though they quoted William Horner, United States engineer, as estimating Mexican reserves at 2,000,000,000 bbl.

Another talk was that given by Carlos Reynosa, assistant managing director of Pemex in charge of commercial operations, who said that the Mexican petroleum industry in time of shortage would be able to complement American and British production. He pointed out that all of Pemex expansion had been financed from its own resources except for the single wartime loan of $10,000,000 for the Atzcapotzalco refinery. This loan from the Export-Import Bank, he said, is already 90 per cent covered.

Steep Inch

Products line being built from seacoast to Caracas

THE new 10-mile, 8-in. products pipe line built for Creole Petroleum Corp. and Shell Caribbean Petroleum Co. from the seacoast to Caracas is expected to be placed in operation sometime during the third quarter of this year.

The line, formally known as the Tacagua products pipe line, has been called the "steep inch," since in spots the grade is as much as 45 per cent. It originates at Catia la Mar, about 64 ft. above sea level, crosses the mountains at 2,300 ft., descends 1,000 ft. into the Tacagua Valley, and then climbs again to a crest of 3,100 ft.

It is estimated that the line itself will be laid in 4 to 5 months, while about 7 months will be needed to build the pumping station at Catia la Mar. Macco Pan Pacific has the contract for construction of the line.

The new line will transport motor fuel, aviation gasoline, kerosine, and diesel oil to Caracas, with plugs to be used for product separation. Moving products to the Venezuelan capital now involves a difficult truck and rail haul.

The three diesel-driven pumps at Catia la Mar will have a capacity of about 1,800 bbl. each per hour. At this seacoast site, Creole has built about 340,000 bbl. of tankage, while Shell Caribbean, which shares ownership of the line, will use its present terminal which has a capacity of about 95,000 bbl.

At Caracas, Creole has completed a new bulk plant at Nueva Caracas with about 104,000 bbl. of tankage, and Shell Caribbean will have about 53,500 bbl. storage in its present plant.

Construction of the line was dictated by the rapid increase in petroleum consumption in Caracas as well as by the disadvantages of the existing trunk-rail haul. In recent years, sales of motor gasoline in Caracas have increased 31 per cent and kerosine by 20 per cent.

Communication between the terminal at Catia la Mar and Caracas will be by FM-radio teletype and telephone. During the first year, Venezuelan personnel will be given special training in operation of the line, and the two companies plan to replace foreign technicians by Venezuelans as rapidly as possible.

THREE-HAT MAN.—This picture was taken at the 1 Pinedale, an Imperial Oil, Ltd., wildcat, when the temperature was 53° below zero. Location is 50 miles northwest of Edmonton in northern Alberta. Slim Owre, roughneck, is checking the frost-encrusted mechanism for operating the hydraulic control head of the blowout preventer. In addition to his safety hat, Owre wears second hat for warmth and a hood to keep out the wind. The scene illustrates one of the principal difficulties of winter operations in the area.

Fewer Rigs

Only 96 operating at end of January in Venezuela

A TOTAL of 96 rigs were reported operating in Venezuela in January in comparison to 101 the previous month. Included in the January total were 22 rigs drilling exploratory wells.

Shell and Mene Grande showed the greatest number of active rigs with 24 each. Sixteen were reported for Creole. Other operators and number of rigs in January were: Texas 1, Las Mercedes 6, Sinclair 5, Richmond 2, Socony-Vacuum 6, Phillips 5, Venezuelan Atlantic 6, and British Controlled Oilfields 1.

A breakdown of the types of operation with previous periods follows:

	Jan. 1950	Dec. 1949	Aug. 1949	Jan. 1949
Field wells	57	62	59	**85**
Exploratory wells	22	19	33	**35**
Workovers and cleanouts	17	20	20	**14**
Total	96	101	112	**134**

Creole's own monthly report for December shows an average of 11.9 rigs operating during the month, not including workovers and cleanouts. Ten wells, including one exploratory operation, were completed. All were oil producers. The exploratory well, in Pedernales, was bottomed at 6,825 ft., and initial production was 1,272 bbl. daily. Of the field wells, four were completed in Quiriquire field and five in Bolivar Coastal.

Creole's production during December averaged 622,855 bbl. daily, representing little change from November's 621,301 bbl. daily. Of the December daily average, 486,050 bbl. daily was from the Lake Maracaibo area, 3,309 bbl. daily from Cumarebo, and 132,996 bbl. daily from Eastern Venezuela. Refinery runs during December were 66,695 bbl. daily at Caripito and 10,418 bbl. daily at La Salina.

Better Attitude Indicated

Some possible improvement in the position of American oil companies in Argentina has been indicated

in the discussions between Argentine and United States officials in Buenos Aires on the subject of a trade agreement between the two countries.

Foreign oil capital in Argentina has long felt itself gradually being squeezed out of the country as a result of various steps on the part of the government.

Dispatches from Buenos Aires said that President Peron had reiterated that Article 40 in the new constitution, which provides for the purchase or expropriation of all public services, would not be invoked against United States and other foreign oil companies, meat packing plants, or power companies.

It also was said that Ramon Cereijo, head of the Argentine National Economic Council, had indicated his willingness to approach the problem of the private oil companies "in terms of a long-term agreement to divide imports of crude oil between those companies and the government oil agency on a pro rata basis."

This developed in discussions between Cereijo and other Argentine officials and Edward G. Miller, Jr., assistant United States secretary of state. The goal is a trade agreement to replace the outdated treaty of 1853. The new agreement probably would be modeled in general along the lines of the recent pact with Uruguay.

The foreign companies in Argentina still retain producing and refining as well as marketing properties. The industry expansion, however, has largely been by Yacimientos Petroliferos Fiscales, the state-owned agency.

MIDDLE EAST

Increase in Royalty?

Iran's Parliament begins debate on revision of agreement with Anglo-Iranian providing 50 per cent royalty increase

THE new Iranian Parliament has opened debate on the important and possibly far-reaching revision of the concession agreement with Anglo-Iranian Oil Co., Ltd.

The revision provides for an increase of about 50 per cent in the royalty paid by the company. The higher royalties in Iran may be used to back up similar demands by other Middle East governments.

The amendments to the concession were decided upon after protracted negotiations between company and government officials more than a year ago. A filibuster in the Parliament prevented a vote on the bill embodying the agreement, and the body dissolved last July without formal action.

Dispatches from Teheran said that anti-British feeling was increasing, as is usual when the royalties question is publicly discussed. Iranian politicians opposing the new agreement were said to be advancing the argument that the United States is on their side, though the United States Embassy was making it clear this country is strictly neutral.

What is involved.—Iran is depending heavily on oil royalties to finance its projected 7-year improvement plan. This program was drawn up largely by American technicians and engineers.

As disclosed last year in Teheran, the revision of the concession contract provides raising royalty from 4 to 6 shillings per long ton and increasing the excise tax from 9 pence to 1 shilling a ton. Iran would receive not only 20 per cent of the amount distributed to stockholders above 5 per cent as provided in the present contract, but also 20 per cent of undistributed profits carried to general reserves.

Iran's present royalty is considered to be equivalent to about 22-23 cents a barrel and was basically unaffected by devaluation since the value of the stipulated sterling is tied to the price of gold. The terms as reported indicate an increase in royalty of at least 50 per cent and possibly more.

Iran is the largest British-controlled source of crude production with output now in excess of 600,000 bbl. daily. The original agreement was revised in 1933 to run for 60 years and covers an area of some 100,000 sq. miles.

Wage question.—Another development in connection with the Anglo-Iranian operations was a recent report that an International Labor Organization's committee is now investigating charges made at the 1948 conference of the organization that wages paid the Iranian workers are below Iranian standards.

The I.L.O. is a part of the United Nations, classified as a specialized agency of the U.N. Anglo-Iranian, like other oil companies operating in foreign areas, carries out an immense program of welfare for its workers.

Turkey Wildcat Spudded

Wildcat drilling operations have been commenced in the Adana-Kodjaeli region of Turkey by the government Institute for Mineral Research which is in charge of oil development in the country.

Testing of this area along the Mediterranean Coast north of Syria was a part of the 1950 program of the institute. A report from Ankara said that drilling also has been started at Adzikara in the same area.

Drilling is continuing in Ramandag field in an effort to determine fully the field's extent. It was also reported that experiments have been successfully carried out on the use of unrefined 20° asphaltic Ramandag crude in railroad locomotives and that 12 locomotives are now using the crude.

FAR EAST

Sabotage in Burma

Depredations occurring in the oil fields of Central Burma in recent weeks illustrate the reasons behind the decision of Burmah Oil Co., Ltd., to suspend rehabilitation work in the country.

Thieves recently stripped and removed derricks belonging to British Burmah Petroleum Co., Ltd., in Chauk field, and more recently saboteurs drained oil from transformers in three substations, putting them out of operation.

Burmah Oil reported that a gang removed valuable equipment from Negya, in the Chauk area, using 20 bullock carts to haul it away. In three thefts of oil, 9,100 gal. of crude and kerosine were stolen.

The latest incident was the holdup of a British member of the Burmah Oil staff by a gang of Burmans, armed with revolvers. His car was taken. This occurred in the oil fields near the spot where a company working party earlier was ambushed and two trucks seized.

F. J. Erroll, British parliamentary delegate, said after a visit to the field area: "Unless effective government action is taken soon to protect the fields from these depredations, there may soon be no oil field left."

New Guinea Exports

The first tanker of crude from New Guinea has arrived in Australia, and increasing supplies from this source are expected.

The oil was imported by Vacuum Oil Co., Pty., Ltd., from Netherlands New Guinea where production was commenced commercially in December 1948 and which is now averaging about 5,000 bbl. daily.

Vacuum Oil is a subsidiary of Standard-Vacuum Oil Co. which, with Shell and a Texaco-Standard of California subsidiary, is a partner in the Dutch New Guinea producing operations. The Vacuum refinery at Altona, Victoria, has heretofore used largely South American crude. The Altona plant produces principally lubricating oil.

The Australian public and officials

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have long hoped for a domestic source of crude. Vacuum and an Anglo-Iranian subsidiary, along with some Australian capital, are engaged in exploratory drilling, thus far unsuccessful, in southeastern New Guinea in Australian territory.

A report from Melbourne said the Commonwealth Government had asked American oil companies interested in the country—Caltex and Vacuum—to consider constructing additional refining capacity. It was indicated tariff and taxation concessions would be offered.

India Takes U.S. Lubes

WASHINGTON.—The Department of Commerce announced last week that pending formation of a more definite import licensing policy for the period ending next June 30, the Government of India will grant licenses for the importation of lubricating oil from the United States.

Imports will be permitted only through established importers, the department said. No indication was given of the volume of lubricating oil which would be permitted entry into India during the first half of this year.

EUROPE

Lost Reserves

Austria blames Russia for heavy damage to reservoirs

WASHINGTON.—The Austrian Government last week charged Russia with so mismanaging lower Austrian oil fields that reserves estimated to last for about 30 years will be depleted in less than one-third that time.

A report released through Austrian officials in this country stated that production in Zistersdorf and Matzen, which dropped in 1945 to 450,000 tons from 1,213,000 tons the preceding year but was later rebuilt to between 910,000 and 950,000 tons, declined again last year to 800,000 tons.

"At first," the report said, "the Russians hoped to offset this production decline with the oil obtained from the promising deposits discovered in Matzen in the summer of 1949, but the use of oversized blast pipes and untrained technical personnel soon led to a daily drop of 630 to 500 tons at Matzen as well."

Richest field.—"If rationally tapped, the Matzen oil deposits, which are generally regarded as the richest in Austria, would last for about 30 years. Today, however, there is serious danger that the Matzen oil fields, as well as the others in the Zistersdorf area, with reserves estimated at about 8,000,000 tons, will be depleted in 8 to 10 years."

Only one-third of the Zistersdorf output, or about 250,000 tons, is released to Austria by the Russians, although the country's domestic requirements alone amount to 500,000 tons a year, and this deficit must be made up by costly imports from Italy and the United States, it was explained. The remaining two-thirds of the oil is shipped to Switzerland, the Soviet Union, or to one of the satellite states. Austria is not permitted to levy either customs duties or transportation charges on these exports which, at the current market price of $30 a ton, are estimated to amount to $17,000,000 a year.

Austria charged further that the Soviets dismantled drilling equipment and installations valued at $15,000,000 after the war, and the equipment the Russians removed and partly replaced by inferior Russian machinery included 83 per cent of all existing drilling machinery, 75 per cent of the diesel motors, 74 per cent of the pumping engines, and 35 per cent of the compressors.

Spanish Refinery Starts

The new Spanish refinery at Escombreras, a suburb of Cartagena, in which the Caltex organization holds a minority interest, has started production on a small scale and is due to be officially inaugurated in the near future.

First work on the refinery was begun prior to the war, and last June Escombreras Petroleum Refinery, S.A., was organized to complete and expand the project. Capacity is 5,000 bbl. daily, to be later expanded to 20,000 bbl. daily. Caltex Oil Products Co. holds 24 per cent interest, 52 per cent is held by the National Institute of Industry, and 24 per cent by Spanish Petroleum Co., S.A.

The Spanish Government's program for the next 2 years as announced recently in Madrid contemplates expansion of the refinery at Escombreras and the plant of Spanish Petroleum Co. to reach a production of more than 1,500,000 tons a year (about 30,000 bbl. daily), with an additional 200,000 tons of lubricants annually.

Ruhr Plant to Operate

The Gelsenberg hydrogenation plant near Gelsenkirchen in the Ruhr district of Germany has received a permit for the distillation of crude yielding 15,000 tons of residue per month.

The oil residue will be treated in the Gelsenberg facilities. The 15,000 tons permitted monthly is equivalent to about 3,000 bbl. daily. In addition, the plant holds permits for the production of 600 tons of sulfur, 150 tons of montan wax, and 1,800 tons of ammonia sulfate monthly. Western Germany strongly resisted dismantling of this plant as was originally planned. An agreement last year exempted it from dismantling.

U.K. Equipment Exports

Orders received in the United Kingdom in 1949 for oil equipment for export totaled £63,836,421, more than £3,500,000 in excess of the total for 1948, according to a report of the Oil Companies' Materials Secretariat in London.

It was said in London that devaluation is stimulating orders from hard-currency customers and at the same time encouraging British oil companies to buy equipment from home sources as far as possible.

Concession Agreement

Gulf Oil Corp. has agreed to limited participation by the government in its exploration program in Denmark.

Under terms of an agreement between the company and the government, the concession is to be extended 50 years and Gulf will give the Danish State 5 per cent of the share capital in the enterprise without payment.

The Danish minister of public works said in Copenhagen that the concession will be transferred to a new company registered in Denmark.

The concession is now held by Danish American Prospecting Co. (Dapco), a Gulf subsidiary. The revision of the concession agreement follows discussions between the government and the company which were undertaken late in 1948 after an attack on the concession's validity.

Claims that the 1938 salt discovery forming the basis for the exclusive concession may have been fraudulent were made by a technical committee appointed by the minister. Gulf subsequently suspended its exploration work until the situation cleared. The new agreement presumably means the work will now be resumed.

Refinery Contract Let

Contract for engineering and construction of all process units in British American Oil Co.'s proposed refinery at Edmonton, Alta., has been awarded Canadian Kellogg, Ltd.

The company just last week announced plans to construct a pipe-line outlet from Redwater field to Edmonton with a capacity of 10,000 bbl. daily.

Kellogg said the new refinery will have a capacity of 2,000,000 bbl. a year and will include combination crude and thermal cracking, delayed coking, fluid catalytic cracking, and complete chemical treating facilities.

The refinery at Edmonton will be the third British American refinery in the West. With Imperial's Winnipeg contract, this makes two major prairie refining jobs for Canadian Kellogg.

Redwater field, with reserves estimated at more than 600,000,000 bbl., now is producing about 15,000 bbl daily.

PERSONALS

Joins Deep Rock

Houy is general production superintendent under Huey

CARL A. HOUY has been appointed general superintendent of crude-oil production for Deep Rock Oil Corp., Tulsa.

Formerly vice president of the gas division of Republic Natural Gas Co., Dallas, Houy also was in charge of all engineering and drilling for that firm. In his new position he will work under R. K. Huey, vice president of Deep Rock's production department.

Houy attended the Schreiner Institute at Kerrville, Tex., then specialized in petroleum engineering at the University of Texas. He began his career in the oil industry when he joined Humble Oil & Refining Co. in 1937.

In 1940 Houy transferred to Republic Natural Gas at Dallas as an engineer. He later served as assistant superintendent prior to his appointment as vice president of that company.

He is a member of the American Petroleum Institute, Independent Petroleum Association of America, and the Natural Gas Association.

Thomas S. Johnston, veteran of 20 years' experience in the oil-transportation business, has been appointed vice president in charge of transportation for Interprovincial Pipe Line Co., Toronto. He became associated with Imperial Oil, Ltd., in 1945.

J. T. Lee, district engineer at Kelsey, Tex., for Humble Oil & Refining Co., has been transferred to the Tyler, Tex., division office as senior civil engineer. Other changes in the Texas production department include: **W. A. Schaefer,** formerly district engineer at London, transferred to Hawkins as district engineer, and replaced by **Fred S. Godbold,** who formerly was district engineer at Opelousas, La., gas-plant construction district; **D. W. Marston,** district engineer, Hawkins, transferred to the Tyler division as senior civil engineer; and **Jim H. Kinsey,** compressor-plant foreman, Lovell Lake repressuring plant, transferred to Clear Lake gasoline plant as gas-plant superintendent. Changes in the Louisiana division include: **Homer Harris,** district superintendent, Homer, transferred to the Sunniland district replacing **S. E. Wallette,** who transferred to the Mallalieu district in Mississippi; **L. H. Riley,** formerly district superintendent at Mallalieu, transferred to the Avery Island district replacing **John B. Payne,** who was transferred to the Lovell Lake district, Gulf Coast division. **Shiles D. McCarty** and **W. D. Clift,** district petroleum engineers, Eucutta district, Mississippi, have been transferred to New Orleans as senior petroleum engineers; **J. E. Graham,** district petroleum engineer, Grand Isle, has been transferred to New Orleans as senior engineer; **A. H. Townsend,** farm boss at Grand Isle, has been moved to Eucutta replacing **J. M. Nesmith,** who was sent to Mallalieu; and **R. R. Alworth,** formerly farm boss at Grand Isle, sent to Mallalieu replacing Nesmith. **W. H. Arnold,** tool pusher at Grand Isle, has been moved to the Paradis district.

I. G. Burrell, division superintendent for Ohio Oil Co. at Marshall, Ill., has been transferred in the same capacity to Terre Haute, Ind. Other transfers include: **R. E. Knipe,** division geologist, Marshall to Casper, Wyo.; and **H. R. Bolton,** division petroleum engineer, Marshall to Terre Haute. **A. L. Henderson** is manager of the Terre Haute division.

Vern L. Adams, senior production foreman for General Petroleum Corp. at Santa Fe Springs, Calif., and the first employe to complete 40 years' service with this company, retired on March 1, and will be replaced by **J. W. Nobile.**

J. E. Gosline, assistant general manager of the producing department, Standard Oil Co. of California, has returned to San Francisco from a special assignment with the Arabian American Oil Co. in Saudi Arabia.

M. P. Jones, Dallas, formerly president of Geotechnical Exploration Corp., has resigned to enter the consulting field. He served as executive vice president before being named president of Geotechnical. He joined that firm in April 1944.

R. J. Braden, Marietta, Ohio, has been elected to the board of directors of Seminole Oil & Gas Corp., and **V. J. Mario** has been appointed vice president and treasurer. Braden is president of a number of oil companies, including the Braden Oil Co. and Falling Rock Producing Co. Mario has been with the company since 1934, serving in the Dallas district office.

B. E. Hull, president of Trans-Arabian Pipe Line Co., was presented with an honor award for notable achievement in pipe-line construction by the Alumni Association of Stevens Institute of Technology at the association's annual dinner last week in New York. Hull, who is also vice president of The Texas Co., and formerly president of Texas Pipeline Co., directed construction of the Big Inch system during World War II and is now building the 30-31-in. trans-Arabian line which will carry crude from Saudi Arabia to the eastern Mediterranean.

J. K. Hartmann, geologist for Champlin Refining Co.'s Permian basin district, has transferred to Midland, Tex., where the company is establishing district offices. **R. L. Walker** is land man. Hartman formerly was geologist for the Los Nietos Co. and Amerada Petroleum Co.

NEW ORGANIZATION. — *Officers of the newly organized Canadian Society of Exploration Geophysicists are, left to right: C. M. Moore, Jr., Geophysical Service, Inc., vice president; L. L. Richards, Hudson's Bay Oil & Gas Co., secretary-treasurer; and John O. Galloway, consultant, president. The group is headquartered in Calgary, Alta., and is the first local geophysical society outside the United States to be affiliated with the national Society of Exploration Geophysicists.*

HYCAR pack-off molded by Murray Rubber Company, Houston, Texas.

O-C-T Type "C-19" Casing Hanger manufactured by Oil Center Tool Co., Houston, Texas.

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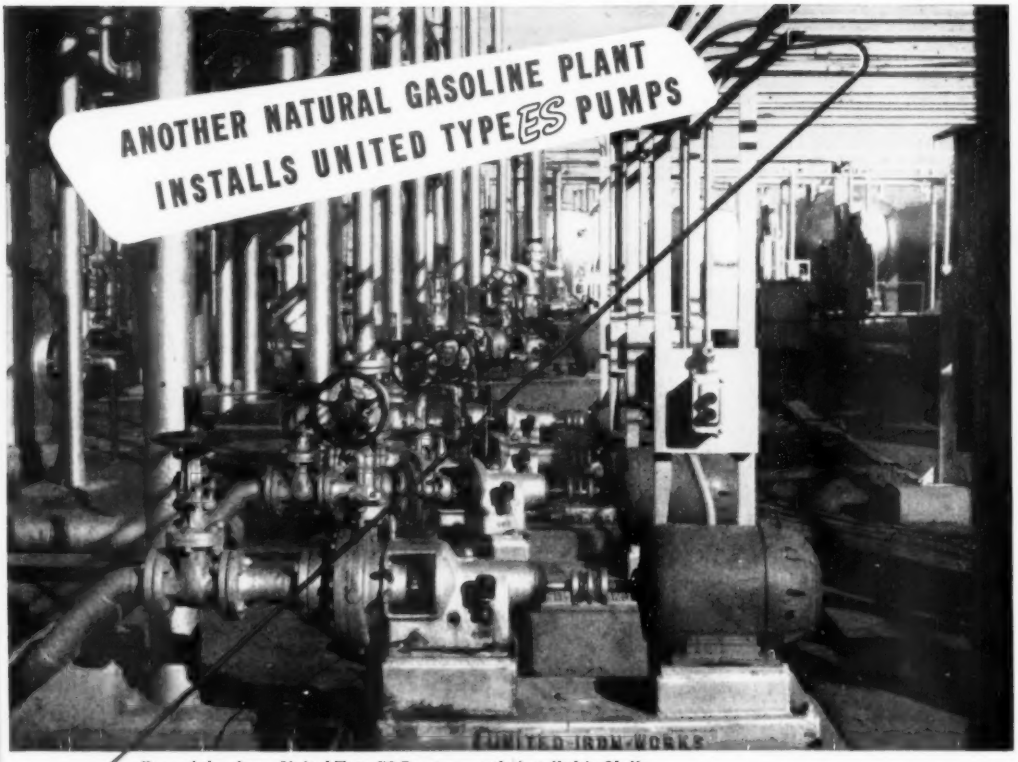

Four of the eleven United Type ES Pumps recently installed in Skelly Oil Company's Velma, Oklahoma natural gasoline plant.

To meet exacting requirements in the handling of 550° F. absorption oil, rich absorption oil, and light hydrocarbons, eleven United Type ES Pumps are employed by Skelly Oil Company's modern Velma, Oklahoma natural gasoline plant.

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PERSONALS

S. B. POWELL

Stephen Burdette Powell, district geologist for Midstates Oil Corp. at Wichita, has resigned to enter partnership in the consulting field with **Emmett R. Elledge,** geologist. Powell is a graduate of Colgate University, and attended Virginia Polytechnic Institute. He was with Atlantic Refining Co. prior to joining Midstates.

C. A. Johnson of Socal Oil & Refining Co., has been reelected president of the Independent Refiners' Association of California. Other officers reelected are: **D. B. O'Neill,** vice president and general manager; **W. F. Barshfield,** Harbor Refining Co., vice president; and **N. D. Taylor,** Hancock Oil Co., secretary-treasurer.

Joseph M. McLaughlin, Magnolia Petroleum Co., has been named foreman in the Kermit, Tex., producing district. He formerly served as assistant foreman.

Charles L. Moore, for the last 5 years a petroleum engineer for the Bureau of Mines, Washington, D. C., and for many years employed by Chanslor-Canfield Midway Oil Co. in California, has resigned his government position to become production engineer for Mexican American Oil Co. in Mexico City.

J. B. Ashmun and **H. T. Hilliard** have opened offices in Midland, Tex., as independent operators. Ashmun formerly was with Rowan Drilling Co., and Hilliard formerly was a geological scout in West Texas for Gulf Oil Corp.

J. Bennett Hill, director of the chemical and engineering division, Sun Oil Co.'s research and development department, has been appointed chairman of the subcommittee on aircraft fuels of the National Advisory Committee for Aeronautics.

C. H. Ervin, Midland, Tex., has been named chief scout for the West Texas-New Mexico division, Humble Oil & Refining Co., succeeding the late S. S. Stinson. He has been a member of the division staff since 1946.

Dr. Oscar E. Bransky, acting chief of the petroleum branch, Economic Cooperation Administration, has been named chief of the division, succeeding **Walter J. Levy,** who left the post in September. Bransky, who joined ECA in August 1948 as petroleum consultant, was formerly with Standard Oil Co. (Ind.) for 38 years.

Edward J. Nopper has been appointed assistant chief engineer of Sun Oil Co.'s manufacturing department. He joined Susquehanna Pipe Line Co., a Sun affiliate, in 1932 and transferred to Sun in 1935.

William Burns, Bayonne, N. J., has been appointed shift foreman in the cracking department at Tide Water Associated Oil Co.'s Bayonne refinery. He has been with the company 32 years.

John Buckley, district production superintendent in Michigan for Sohio Petroleum Co., and was elected chairman of the Michigan chapter, American Petroleum Institute, succeeding **Earl Hartman,** president, Gordon Oil Co. Other officers elected include: **Vance Orr,** Roosevelt Oil & Refining Corp., and **Don W. Conaway,** Ohio Oil Co., vice chairmen; and **William Bryan,** Dowell Incorporated, secretary-treasurer. Hartman; **Lester LeFavour,** Gulf Refining Co.; **Carl Wender,** Sun Oil Co.; **Ollie Irvin,** Union Rotary Corp.; and **Fred Turner,** Turner Petroleum Corp., were elected to the board of directors.

Victor de Metz, president and director-general of Cia. Francaise des Petroles, is expected to return to his headquarters in Paris early in March after a business trip to the United States, Mexico, and Venezuela. He

TEXACO PRODUCTION COMMITTEE.—Above are members of The Texas Co.'s producing committee who attended a recent meeting in New York City. Seated, left to right: M. J. Heald, Oklahoma division manager; J. T. Wood, Jr., assistant to the president; C. B. Williams, West Texas division manager; R. F. Baker and R. Ogarrio, vice presidents; E. R. Filley, general manager; A. R. Wilson and J. N. Troxell, assistant managers; J. H. Puls, Pacific Coast division manager; W. V. Vietti, gas division manager; and A. C. Hunter, assistant to the general manager. Standing, left to right: J. C. Brooks, department agent; J. W. Foley, assistant to the vice president; H. H. Arnold, Jr., Rocky Mountain division manager; R. L. Keyes, Louisiana division manager; W. C. Kneale, South Texas division manager; G. Herzog, director of research; E. P. Hayes, chief petroleum engineer; J. O. Bower, manager, Texas Petroleum Co., Bogota, Colombia; L. A. Scholl, Jr., geophysical division manager; W. J. Hanley, secretary to Ogarrio; R. E. King, staff geologist; and H. Brunjes and J. D. Elson, Jr., production staff, New York City.

PERSONALS

SHELL HOLDS QUARTERLY CRUDE-OIL MEETING.—Officials attending a recent quarterly crude-oil meeting at Shell Oil Co.'s Houston headquarters discussed plans for procuring, manufacturing, and transportation of crude oil for five of the company's refineries. Left to right: Richard Bard, assistant manager, crude-oil department, New York; L. R. Goldsmith, economic-development department, New York; T. R. Grieve, regional administrative department; N. J. Derbes, assistant manager, manufacturing-operations department, New York; E. E. Griffith, manufacturing-operations department, New York; H. H. Anderson, vice president, Shell Pipe Line Corp.; George Miller, Shell Pipe Line Corp.; E. McIver, crude-oil department; M. E. Overman, assistant manager, crude-oil department, New York; A. P. Reuther, manager, crude-oil department, New York; D. B. Hodges, vice president, transportation and supplies, New York; E. A. Bacon, manager, crude-oil department, Tulsa area; J. K. Moore, regional crude-oil department; and O. D. Crites, manager, regional crude-oil department.

arrived in New York early in February and was to return last week from Mexico and Venezuela for another short stay in New York before leaving for Paris.

D. R. Wadlington, Monahans, Tex., has joined the Texas Railroad Commission as petroleum engineer.

D. C. Chambers, tool pusher for Wheless Drilling Co. at LaFayette, La., has been transferred to the Gonzales, La., area in the same capacity.

SHIFTS

Buck J. Miller, engineer, The Texas Co., Fort Worth to Wichita Falls, Tex.; **Robert E. Bulter,** geologist, Cities Service Oil Co., Houston, to Eunice, La.; **Edward L. Dillon,** geologist, Shell Oil Co., Houston to Midland, Tex.; **Jack Allen Morgan,** engineer, Sun Oil Co., Kilgore, Tex., to Brookhaven, Miss.; **Roy E. Campbell,** engineer, Stanolind Oil & Gas Co., Levelland to Odessa, Tex.; **D. H. Trahan,** engineer, Shell Oil Co., Midland to Odessa, Tex.; **Peck Hardee, Jr.,** engineer, Texas Pacific Coal & Oil Co., Odessa to Midland, Tex.

L. M. Rhea, superintendent, Wheless Drilling Co., Junction City, Ark., to Homer, La.; **L. J. Trahan,** superintendent, Rouge Oil Co., Inc., Baton Rouge to Ewing, Va.; **R. W. Phillips,** engineer, Shell Oil Co., Lake Charles, La., to San Angelo, Tex.; **James R. Harms,** Carter Oil Co., El Dorado, Ark., to Springhill, La.; **William A. Ackerman,** engineer, Sun Oil Co., Havertown to Ridley Park, Pa.

DEATHS

Adelbert B. Hookins, for many years an official of Prairie Oil & Gas Co., and later with Sinclair Prairie Oil Marketing Co., died in Independence, Kans., February 11. He began his career in the oil industry as a young boy in the oil fields near Titusville, Pa. He joined Prairie Oil & Gas Co. at Neodesha, Kans., in 1904, and for a number of years served as treasurer of Prairie Oil & Gas Co. at Independence. After the Sinclair Prairie merger in 1932, Hookins continued in that capacity for Sinclair Prairie Oil Marketing Co. He retired in 1945.

B. Tyler Bryan, 56, Beaumont, Tex., oil man, died February 18.

Harley T. Cook, 49, Allegan, Mich., drilling contractor, died February 18.

Carl G. Naylor, 70, founder and president of Naylor Pipe Co., Chicago, died February 13. He was instrumental in developing the first spiral-welded pipe and the equipment required in its production.

Raymond C. Bradbury, 59, Tulsa, district representative for Carborundum Co., died February 26.

Franklin J. Keeley, 76, retired oil producer, died in Oil City, Pa., February 20.

Ralph R. La Bat, 61, with The Texas Co. 31 years, died in Houston February 17.

Jacob C. Baker, 39, employe of Humble Oil & Refining Co., at Genoa, Tex., died February 20.

J. G. Bischoff, 60, superintendent of production for Deep Rock Oil Corp.'s Drumright, Okla., district, died February 15. He was the oldest Deep Rock employe in point of service, having joined the C. B. Shaffer interests, predecessor of Deep Rock, in 1913.

Thomas B. Wright, 58, president of Seminole Oil & Gas Corp., Dallas, and chairman of the board of Titan Pump & Engineering Corp., Detroit, died in New York February 26.

Alfred D. Brownlee, 77, Wyoming, Ont., Canada, well known Canadian driller, died in Petrolia, Ont., recently.

Clifford M. Whitmore, 47, petroleum engineer, Stanolind Oil & Gas Co., Houston, died February 21.

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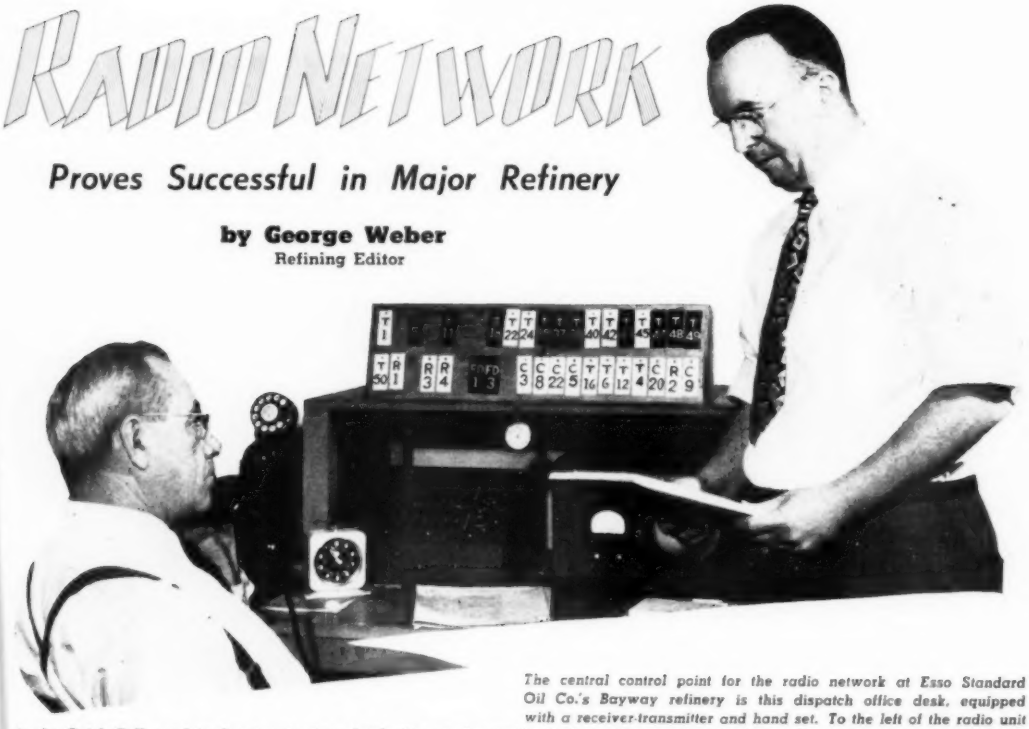
RADIO NETWORK

Proves Successful in Major Refinery

by George Weber
Refining Editor



The central control point for the radio network at Esso Standard Oil Co.'s Bayway refinery is this dispatch office desk, equipped with a receiver-transmitter and hand set. To the left of the radio unit is the Quick Call, used in direct contacting of selective service mobile stations. The peg board, above, shows all radio-equipped trucks, cars, Ross Carriers, and fire-department vehicles. When one of these mobile stations reports "on the air" its corresponding tag is hung on the board white side out, providing the dispatcher with a running record of all vehicles on or off the network.

It hasn't yet come to the point where every refinery man is equipped with a "walkie talkie." But—this story does tell how a refinery can more efficiently dispatch and route service vehicles and mobile intraplant equipment.

A NEW FM radio network, one of the first of its kind in the petroleum-refining industry, is now in successful operation at the Bayway refinery of Esso Standard Oil Co. at Linden, N. J. At present, 33 refinery vehicles are equipped with transmitter-receiver sets which link them in direct communication with a central station at the refinery transportation department's dispatch office.

The system was inaugurated last November. The network allows the centralized dispatching of certain key vehicles, replacing control of the various mainteance shops in the refinery. It has already noticeably increased the efficiency of vehicle use and over a period of time may be expected to show substantial savings. An indication of the use now made of the new communications medium is the average of 400 calls transmitted over the network daily.

Equipment

Heart of the network is a fixed or base station located within the 1,600-acre refinery atop the five-story package department building. This station consists of a 60-watt maximum power, Motorola FSTU-50 unit which ties in to a remote control point located in the adjacent dispatch office. Each vehicle mounts a Motorola FMTU-30 two-way unit with maximum power of 10 watts.

The system provides adequate power for its designed use between all points inside the refinery. It is not intended for general use outside the Bayway gates. A second radio network for the Bayonne plant is now in the planning stage.

Mobile stations are installed in 5 passenger cars, 2 fire trucks, 4 Ross Carriers and 22 trucks of varying capacity. Plans for expansion of the network include addition of 5 cars and 18 trucks.

All stations operated on a common frequency of 153.35 megacycles, a channel now authorized by the Federal Communications Commission in its new Petroleum Radio Service. All service vehicles in the network are equipped with what are termed "nonselective" sets. When in use their receivers pick up transmissions to and from other nonselective units.

The five cars are provided with "selective service" on the same common frequency. Their units can be set to tune out transmissions of nonselective sets. They are designed to receive individual transmissions from the central station. This is accomplished by a unit in the dispatch office, called the quick call. Each selective service mobile unit has a designated code number. By setting off this code number on the quick call, the dispatch office can transmit directly to any selected passenger car. The vehicle operator need not remain at his receiver to be alerted on incoming calls. The unit may be left on the air and so set that an incoming call from the dispatcher will sound the vehicle horn. Cars provided this selective service include the ambulance, the guard's car, the air-analysis car, the oil-movement and storage-department car and a supervisor's car.

Procedure

Each vehicle operator checks in with the dispatch office to report going on or off the air. The com-

pany requires that vehicles be stopped when transmitting. The dispatcher keeps a visual, running record of mobile stations on and off the air at all times. A log of all transmissions is kept in the dispatch office.

In this network, mobile stations on vehicles are not given individual call letters but are designated by vehicle numbers only. One call letter (KEA-237) is assigned the land station and another, KA2271, the mobile units. Regulations require that call letters be given at the end of each transmission or exchange of transmissions, during light traffic, or once each 15 minutes during daytime periods of heavy transmission volume.

The network is supervised from the dispatch office from 7:45 a.m. to 4:15 p.m., Monday through Friday. During nights and week ends, control reverts to the main refinery switchboard through which radio and telephone transmission of messages may be conducted both ways, but the systems are not electrically interconnected.

Emergency Use

A conversation on the network may be interrupted at any time for an emergency call. In event of a fire, explosion or other serious emergency affecting the operation of the refinery, the following rules apply: Should an emergency occur during the night or week end, the switchboard operators on duty will notify any one of eight licensed transportation department personnel to come in and resume control of the network from the dispatch office. The transportation department will call in a sufficient number of drivers to provide an auxiliary radio network of radio-equipped vehicles ready for use in case of a power failure which might keep the main transmitter from operating. One vehicle in this case would be used as the main dispatch point. During the emergency all vehicle operators in the network would keep motors running at fast idle to prevent drain on the battery and eventual power failure.

Two trucks at the refinery fire station are equipped with selective service units, which afford direct communication from the dispatch office. While these trucks may not be shown as "on the air" at the dispatch office, their operators can be alerted immediately for incoming calls, by a device which sounds the vehicle horn.

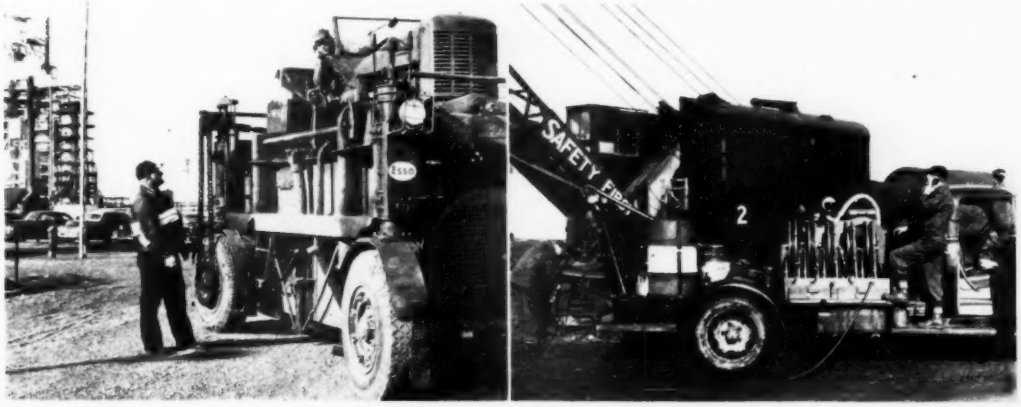
System Leased

The radio system at Bayway is leased from the New Jersey Bell Telephone Co. which installed and maintains all equipment. Vehicles are equipped with 80-amp. oversize generators to provide sufficient power for the mobile stations.

Although the equipment for the network is leased, the using company made application to FCC for its license. It was assigned its frequency by Region I of the National Petroleum Radio Frequency Coordinating Association. This voluntary group in the industry aids FCC by assigning channels to license applicants on a non-interfering basis. As 85 per cent of all petroleum industry radio is still concentrated in Texas and Oklahoma, frequency assignment in the East currently poses few interference problems. The high frequency used by Esso precludes most "skip" interference from distant stations on the same channel, and transmissions in the relatively small refinery area are reported readable at all times. Following the brief experimental status of the network during installation, a permanent license for 5 years is now pending.

Interest in radio at Bayway grew out of a radio service to which the company subscribed for its visiting nurses last summer. FM radios were installed by Bell in two Esso company nurses' cars. Communication was by means of radio between cars and a central station in Newark and by wire between the station and the refinery switchboard. This system, operating over a radius of 20 miles or more, allowed nurses to save much mileage in making calls on employes and their families and also provided for quicker contact in case of emergency.

Left: This Ross Carrier is equipped with a special weatherproof cabinet housing the receiver-transmitter unit, with a direct-mounted aerial. Company rules require that an operator stop his vehicle before transmitting or receiving messages. Right: This lubrication unit, shown servicing a mobile crane, is typical of the 22 trucks operating in the refinery radio network. Centralized control of such vehicles is expected to minimize unnecessary mileage, at the same time expediting maintenance and transport services.



Niagaran Reefs in Illinois and Their Relation to Oil Accumulation

by H. A. Lowenstam

IN Illinois the Silurian rocks which show the greatest promise as oil reservoirs are the Niagaran reef lenses. Oil production from the Niagaran reefs of Illinois is of two distinct types. The reef rock itself may act as the reservoir, or overlying Mississippian or Devonian formations may produce oil from the structures formed as a result of differential compaction over the rigid reef bodies.

Oil has been produced from Devonian and Mississippian rocks above several known Niagaran reefs: Marine, Sandoval, Bartelso, and McKinley. It appears quite possible from a study of the structural relations as shown on upper horizons that certain other pools, such as Tonti and Patoka, may be underlain by Niagaran reefs.

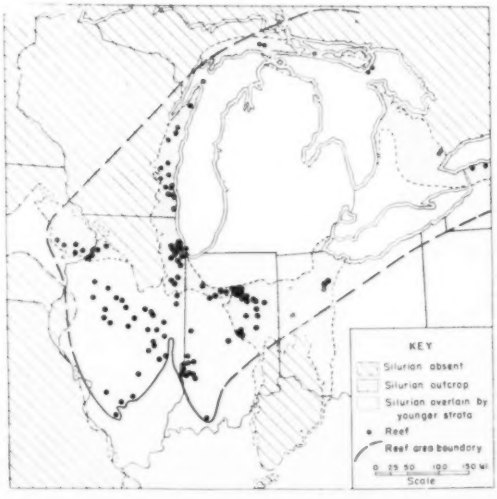
This article is a portion of Illinois State Geological Survey's Report of Investigations No. 145, with same title as the article. Although not labeled as such by the author, the portion included here is practically a "summary and conclusions" of the material discussed in considerable detail in the full 36-page report. The full report was released at Urbana, Ill., on February 13, 1950, and has already attracted great attention among geologists and operators interested in reef oil in Illinois.

The bulk of the oil produced at Marine has been directly from the Niagaran reef body. In addition, an undetermined proportion of the "Devonian" production at Bartelso has been from Niagaran reef rock, and some of the Sandoval production may have been from the underlying reef. Niagaran oil is being produced from the reef at McKinley pool, Washington County.

As the Niagaran reef production found to date has come from the large reefs near the reef front, and as there are considerable areas near the projected portion of the reef front in which the Niagaran is still untested, it appears the future major Niagaran oil production is most likely to be found in the southeasternmost part of the reef-bearing area. It should be pointed out that there is little control for the location of the reef front between western Marion County and Coles County. The actual front is presumably sinuous in this region, showing extensive embayments and prominent reef bastions as it does in the area to the southwest and north-

Fig. 1—(Left) Silurian oil possibilities.

Fig. 2—(Below) Distribution of Silurian strata and location of known reefs.



east in which it can be mapped with greater accuracy.

It is theoretically possible that some reef outlets occur south of the archipelago border, as reef development might have started there during the relatively clear-water phase of St. Clair deposition.

The northeastern limits of the area of greatest likelihood of Niagaran reef production is the LaSalle anticlinal belt, as it appears that all commercial oil has been flushed from reefs on and beyond this structure. That commercial oil at one time was present in the Niagaran reefs of the LaSalle anticlinal belt and of the Chicago outcrop area is indicated by shows of residual "dead" oil through 200 ft. of the Niagaran reef penetrated 3 miles north of Tuscola in Douglas County, by similar shows in Champaign and Ford counties wells, and by the well-known asphalt occurrences in the outcropping reefs of the Chicago area.

Northwest of the belt of greatest reef development and preservation is a parallel belt which presents fair possibilities for reef production. It seems likely that the reefs in this area were smaller than those closer to the front, and in addition they must have been truncated by pre-New Albany as well as pre-Middle Devonian erosion.

Deeply eroded reefs may be present and may produce oil in the central Illinois area with poor possibilities. In addition, it is largely within this area that porosity and permeability related to erosional surfaces may be expected in various nonreef Silurian rocks, with the possibility of light-oil production.

Significant Points

The points of greatest significance in the search for further Niagaran reefs may be summarized as follows: The reef-rock proper always consists of practically pure carbonates, either limestone or dolomites, that have higher electrical resistivity than normal interreef rocks. Reef dolomites are invariably blue-gray in color, coarse-grained and vesicular. Reef limestones are pink to white coquinas, formed almost exclusively of coarse unsorted fossil debris in which corals and stromatoporoids are important constituents. Chert is never present. The two reef rocks are replaced by varied impure carbonate rocks in the common interreef areas. The Niagaran rocks are abnormally thick at reef cores.

In the critical area for oil production where the Moccasin Springs formation is present, reef proximity may be most easily recognized by an abnormally thin section of Bainbridge red-colored beds closest to the reef and by abnormally thick red-colored sections at some distance to the lee of the reef. Fingers of well-sorted fossil debris, chiefly crinoidal but containing noticeable amounts of coral constituents, extend some distance from the reef. Although certain interreef beds may approach these fingers in purity and in fossil density, the coral content is a reliable index for reef proximity. Relative purity of the Niagaran section in general strongly suggests nearness to a reef. All these criteria for reef proximity are applicable only within the southern two-thirds of the low-clastic

(Continued on page 77)

Fig. 3—Niagaran reef occurrences and sedimentation belts in Illinois.

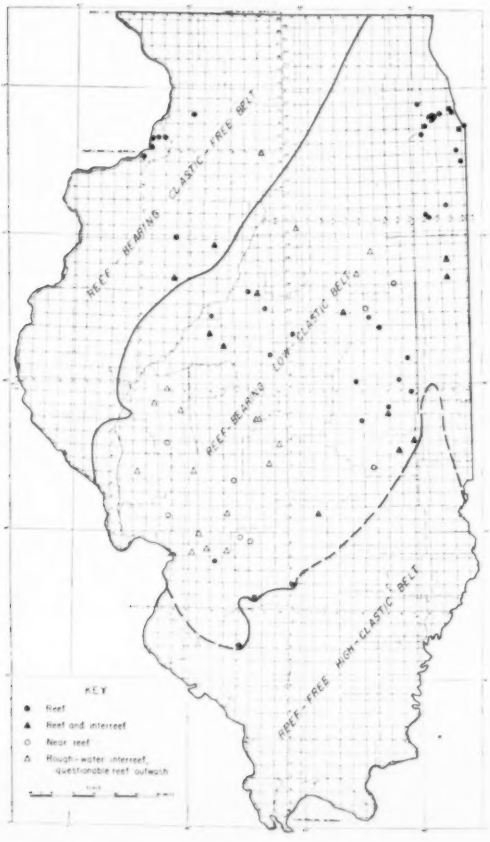
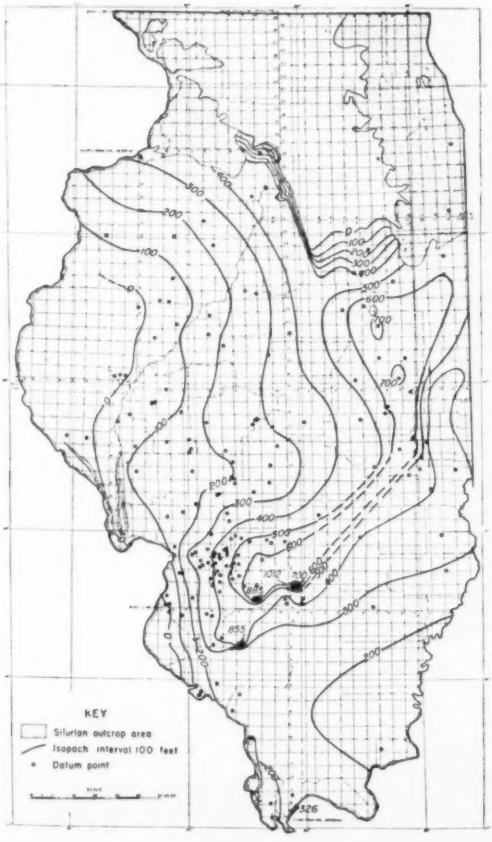
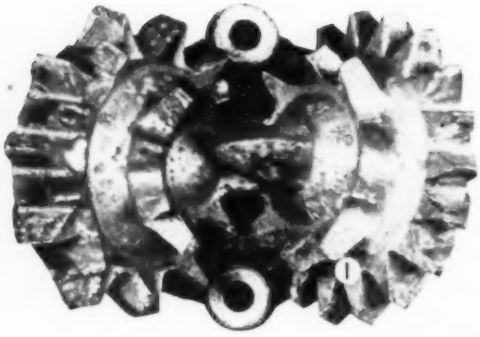


Fig. 4—Thickness of Niagaran strata in Illinois.





1—Showing nozzles of jet-type rock bit.

2—Setup showing high-velocity mud stream from jet nozzles.

3—Jets on fishtail bit.

New DRILLING METHODS and EQUIPMENT

by Earl C. Hellums

The Author

This discussion was presented at a recent meeting of the Houston chapter of the American Petroleum Institute. Reviews of new methods and equipment are an annual feature of the January meeting of this large group. The author is vice president of Cron & Gracey Drilling Corp., Houston. Hellums was born and reared in Lavaca County, Texas; attended Texas A. and M. College, from which he graduated in 1932 as petroleum engineer. He was with the Texas Co. from 1932 to 1936 and then joined Cron & Gracey, starting in the field as a roughneck.

THE items to be discussed in this A.P.I.-Houston group review are not all new, except from the standpoint of field application or test.

Jet-Type Rock Bits

Experimentation with the jet-type rock bit has been continued and a number of wells have been drilled. This type bit employs a high-velocity jet mud stream which results in rapid removal of cuttings and scouring of the bottom of the hole, thereby permitting an increase in the drilling rate. Three-cone and two-cone bits are being used, both of which have long cutting teeth and tungsten carbide nozzles. The three-cone bit has three fluid nozzles and the two cone has two, both bits having the jets positioned to discharge between the cutters onto the bottom, and approximately 1½ in. from the outside of the hole. The nozzles are so directed that approximately 75 per cent of the bottom of the hole is flushed.

Field tests made with jet rock bits to this date in broken and medium-hard formations indicate that they will drill as much or more hole than the conventional rock bit and will drill the hole from 20 to 33 per cent faster. Some trouble has been encountered with premature washing out of the outer nozzle tubes on the two-cone bit; however, it is thought that present contemplated minor changes in bit design will eliminate this problem. The results to date seem promising but all the answers are not yet at hand. A great many more wells will have to be drilled in different areas and formations before the bit can be evaluated fully.

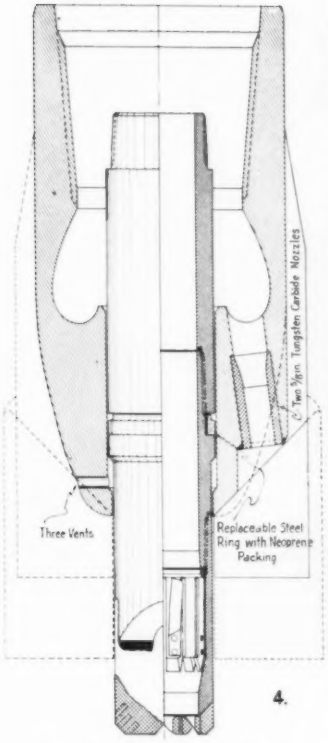
The jet idea has been applied to coring bits, the objective being increased drilling rates between coring points while drilling with the bit plug in place. In addition to the tungsten carbide nozzles, guide ribs have been added to the body of the coring bit to stabilize the bit. The guide ribs seem to have been advantageous as a greater per cent of full-size cores were recovered. A pack-off arrangement has been provided on the core barrel head to seal the space between the barrel and the bit body.

Charging Mud-Pump Suctions

Another development has been in use for some time, and due to the fact that there are a number of installations in operation, I think the practice should be mentioned. This is the charging of power mud-pump suctions by the use of a centrifugal pump.

Fig. 5 shows a 16-in. power pump which has a 5 by 6-in. centrifugal pump charging the suction, the pump being V-belt driven from the main pump sheave. The pump drive is designed to hold 15-psi. pressure on the pump suction at the slowest speed desired on the power pump.

Present information indicates that charging suctions may increase the life of valves and seats and possibly pistons and liners. Complete filling of the pump suction should result in smoother operation at rated maximum pump speed, and may allow in-



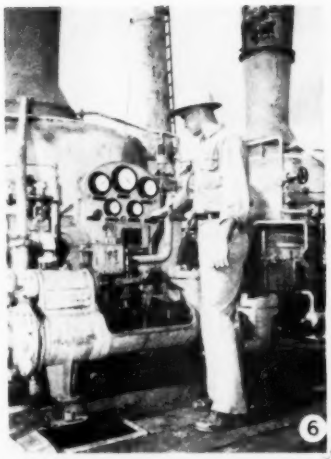
4—Two-way jet wire-line core barrel.

creased speeds. Most of the pump manufacturers are now giving some thought to this subject.

Coil-Type Water-Tube Boiler

An important piece of equipment which is now being field tested is the Bettis boiler. This is a 300-hp. coil-type water-tube boiler which is recommended to produce a maximum of 20,000 lb. of steam per hour at maximum pressure of 500 psi. and up to 500 F. temperature.

The boiler unit includes boiler feed pump and controls, fuel burner and combustion controls, heat exchanger and steam separator, all of which is permanently piped and mounted on one skid. The complete unit weighs 18,500 lb., is 8 ft. wide, 15 ft. 2 in. long, and 8 ft. 1 in. in height with stack removed. The boiler can be

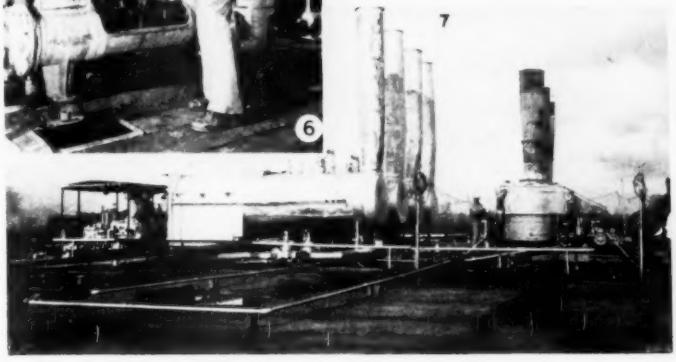


6—C. R. Bayless, Bettis Corp., at controls of new boiler.

7—Three of the new coil-type boilers (right) alongside four conventional oil-country boilers, on a Louisiana drilling location.

equipped for either natural-gas or oil burners.

The boiler has an assembly of five separate coils consisting of one water wall, an outer, intermediate, and inner conical coil, and one drying coil, a total of 1,827 ft. ranging from 1¼ to 2 in. in diameter, and having

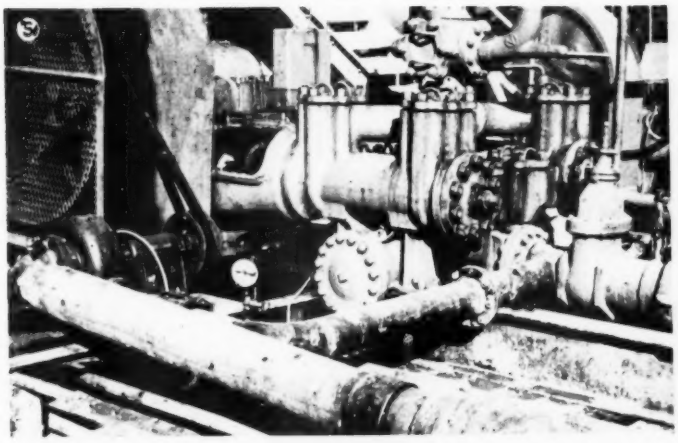


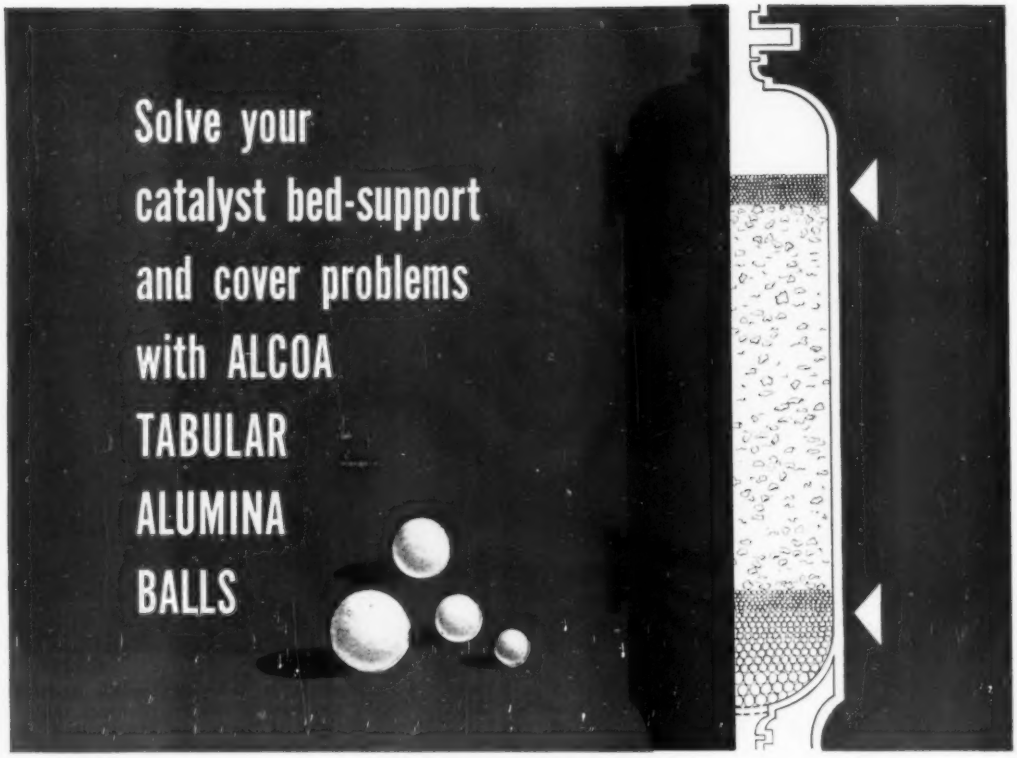
971 sq. ft. of heating surface. It does not have a steam and water drum. Some of the advantages claimed by the manufacturer are safety from explosion hazard, light weight, quick rig-up time, quick steaming, higher efficiency, and dry steam with a slight amount of super heat.

A field test is now in progress on a big steam rig using three Bettis boilers and four 150-hp. standard oil-field fire-tube boilers. The rig, which is now drilling below 12,000 ft., has three 20-in. mud pumps, a 14 by 14-in. engine on the draw works, and a 12 by 12-in. engine driving the rotary. While drilling, the rig has been using two 20-in. pumps compounded on the hole and the other 20-in. pump on the mud pit. The test to date indicates that the average steam demand has been 36,300 lb. per hour, and that two of the water-tube boilers will carry the load while drilling, as compared to the four standard boilers. One Bettis boiler is all that is required to go in the hole, but it requires all three boilers to pull out of the hole, which is due to the large volume of steam required by the 14 by 14-in. engine at high speed under heavy load. The test also indicates that the Bettis boilers are operating at 75 to 82 per cent efficiency, whereas the standard boilers are operating at 60 to 65 per cent efficiency. Further, the new boilers consume 17 to 30 per cent less gas.

The boiler feed water for the Bettis boilers is not being treated, and the manufacturer is of the opinion that scaling of the tubes will not be

5—To right of main slush pump is belt-driven 5 by 6-in. centrifugal pump, charging suction to main pump.





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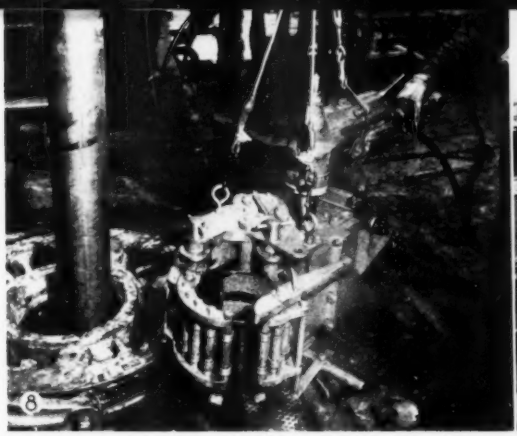
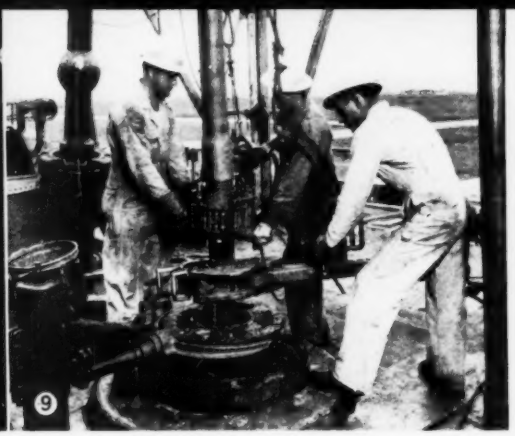




a major problem, due to the velocity of the water and steam in the tubes. The boilers are acid washed periodically, and a method has been devised to shot blast the tubes to break up and remove the scale.

Due to the fact that the test has only been carried on for a comparatively short period, the information to date must be considered as preliminary and not conclusive; however, the boilers have been operating satisfactorily and the results seem very promising.

Drill-Pipe Spinner

Another tool which is now being tested is a drill-pipe spinner which eliminates the use of the spinning chain. It is powered by a 6-hp. air motor driving a drum inside the tool, and on which is wound a spiral spring steel tape. The tape is 4 in. wide, .0020-in. thick, and 12 ft. long, and has an abrasive on the end to grip the pipe.

When going in the hole, the tool with the spiral spring extended is placed over the lower half of the tool joint before the stand of drill pipe is picked up. After the stand has been placed in make-up position, the spinning tool is raised above the tool-joint pin, and the tape grips the drill pipe, spinning it up as the tape is wound on the spinner drum. The tool joint is then tonged up in the usual manner.

Propeller-Type Mud Mixer

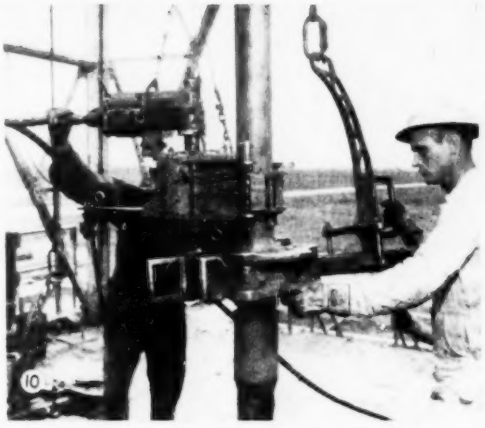
The rotary or propeller-type mud mixer that was in an experimental stage last year has been accepted by the industry and a number of units are now in field use. It is recommended that the unit be powered with a 20-hp. motor, turbine, or engine, which drives a conveyor screw and a 20-in. diam. by 20-in. pitch bladed propeller, the propeller turning 475 r.p.m.

The unit will adequately mix or stir a 400 to 500-bbl. pit of 18-lb. mud. It has a mixing capacity of 300 sacks of weighting material or 100 sacks of gel per hour.

Block Deflector; Automatic Rig

Most of the industry is now familiar with the drill-pipe handling equipment and automatic pipe tongs being used on the Humble Oil & Refining Co. experimental drilling rig. New improvements that recently have been placed in use are the traveling-block deflector and the air-operated drill-pipe elevators, which allow the traveling block to operate continuously while making a trip. These new devices have allowed a considerable reduction in round-trip time, as well as further reducing the physical work of the drilling crew and improving operating safety.

8, 9, 10—Sequence photos of new drill-pipe spinner which eliminates use of the spinning chain. Power is supplied by 6-hp. air motor driving a drum inside the tool.



Formerly the traveling block and elevators were used to support the stand of drill pipe when it was being made up or broken out. In this operation the remote-control pipe racker holds the pipe, making it possible to unlatch the elevators, and the block deflector allows the block to be moved up or down the derrick at the same time that the drill pipe is being broken out or made up. The draw works and the slips are operated by the driller; the power-tong operator also operates the lower racking arm, and power elevators and block deflector are operated by another floor man.

11—Propeller-type mud mixer.

The block-deflector mechanism consists of an 8-ft. stroke air-operated piston which actuates the wire line that is reeved through the crown sheave, the carriage deflector sheaves and the sheave on the side of the block, the line then being anchored at the floor.

There are a number of other developments now in field use that have considerable merit. Some of these developments are the adjustable casing stabbing board, the magnetic coupling, the individual magnetic inspection unit, traveling-block overtravel safety devices, communication devices, and some changes in power pump construction.

In conclusion, it can be stated that some of the recent developments are already effecting worthwhile economies for the industry and others have very good possibilities.

New
PRODUCTION METHODS
and
EQUIPMENT

This discussion was presented at a recent meeting of the Houston chapter of the American Petroleum Institute. Reviews of new methods and equipment are an annual feature of the January meeting of this large group.

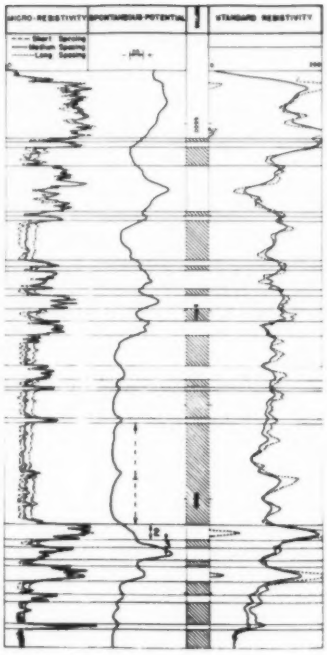


Fig. 1—(Above, left) Microlog and standard electric log.

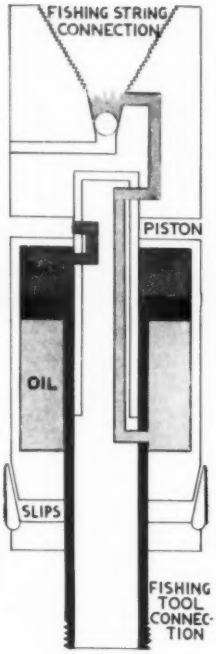


Fig. 2—(Above, right) Hydraulic fishing tool.

Fig. 3—Operational motion and component mechanical units utilized in new hydraulic hoist, shown in successive order.

One-Well Cycling Program

AN old item, yet one appropriate for this review, is a one-well cycling program initiated by Sun Oil Co. in Seabreeze field, Chambers County, Texas, in March 1940. The company had a lease which was about to expire because of no production. One well was drilled but encountered only gas cap of oil-producing sands. With consent from the royalty owners, the company was able to devise and put into effect a program which meant some revenue both to them and to the royalty owners. However, most important, it saved a lease which otherwise would have been lost.

The one well was dually completed in the gas cap of two sands. The gas produced through the tubing passed through an 1,800-psi. separator and was then picked up on one-stage compression, boosted to 3,500 psi., and injected into the casing.

This one-well production and injection operation continued over a period of 7 years at a rate of approximately 3,000 M.c.f. per day. Approxi-

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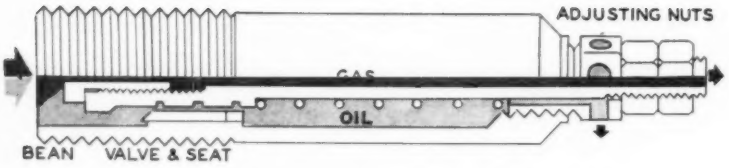


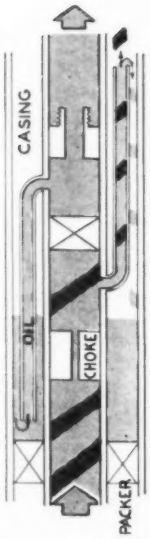
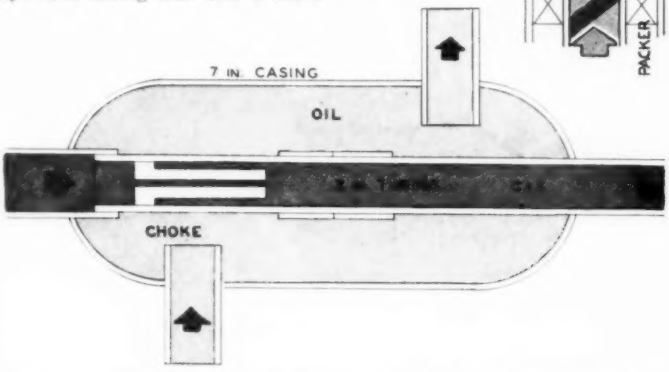


Fig. 4—(Above, left) Automatic purger choke.

Fig. 5—(Below) Heat exchanger for positive choke.

Fig. 6—(Right) Bottom-hole choke and gas separator.



mately 7 million M.c.f. of gas was processed. A total of 59,000 bbl. of condensate was obtained. By this means it was possible to hold a lease until the oil production was uneconomic and the gas could be sold, or until other means of production could be established. This was an ingenious method of maintaining a lease which otherwise might have been lost.

Micrologging Pay Sections

Something that is really new *(The Oil and Gas Journal, December 29, 1949, page 35)*, is the microelectric-log method. The microelectric log is a device which has helped considerably in hard formations. In the Gulf Coast, operators are confronted with soft sands, but some who have offices there (Houston) are also fortunate enough to operate in Scurry County, and other places having hard formations where this instrument is beneficial. The microlog utilizes electrical contacts with spacings narrowed down to 1 and 2 in. With this, it has been possible to measure the resistivity of mud cake.

It is known that mud cake forms opposite porous media; thus where the mud is found, the porous sections are indicated. This has been of invaluable aid to the operators in the hard-rock country and, as was pointed out in The Oil and Gas Journal, it has helped operators obtain any necessary loans from banks in a very short time.

Confidence has been built up in this logging method and it is growing considerably. As yet, in the Gulf Coast area, it is still in the experimental stage as to its use in sandstone. Permeability is in the low order—1, 2, 3, or 4 md.—and certainly production from such permeability might be questionable.

The method has been very beneficial in the completion of certain wells in areas near San Antonio, where previously it was necessary to core, foot by foot, looking for permeability.

The curve on the left in Fig. 1 is the resistivity side of the microlog. This curve would normally appear on the right side, in contrast to the one on the far right on a normal electric log, which is called standard resistivity.

The spontaneous potential, or the self-potential, on the left side, in limestones or dense formation, gives very little indication of hardness. The standard resistivity will give more indication of hardness, but in this case the section marked No. 1 previously would have been questioned because the resistivity side is the same as it is up above that section. However, below section No. 1 a definite hard streak is indicated. The big advantage of this microelectric log is the sharp demarcations in dense and in porous sections.

In Fig. 1 the hatched sections represent those which possess some permeability; that is, a mud cake was built and the resistivity correspondingly recorded.

Hydraulic Fishing Tool

Fig. 2 is a schematic diagram of a hydraulic fishing tool. This is not a new instrument at all. Hydraulic means of lifting is an old art, but certain improvements have made it a very useful tool. This tool is run on a regular string of drill pipe, and any regular fishing tool desired is connected on the bottom. The upper portion is a hydraulic piston. The piston is actuated by the drilling fluid pumped in, as the arrow shows.

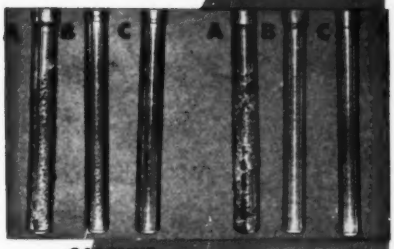
Having run the tool in the hole and engaged the fish, a ball is dropped, and the fluid lifts the piston. The piston then moves up with the carrier, the slips engage on the casing above the fish, and pull is exerted against the string of casing, relieving the fish. In this manner the fish is brought up out of the hole without exerting undue strain on the drill pipe, derrick, or lines. Of course, this piston has a limited means of travel. In the tool there is a means of reversing the action so that the piston keeps on pumping, letting the slips get a new bite each time. The fish is gradually jacked up the hole without exerting undue strain on surface equipment.

This hydraulic fishing tool is very valuable in eliminating screen from open hole. Previously it was a laborious process to find where the screen was stuck and, being unable to do that, the screen was cut in small sections until it could be pulled. Then, the most undesirable feature was getting a large enough rig at the surface to pull it. By the use of this new, improved tool it has been possible to put very small rigs on the location and pull screen sections of much larger size than previously was possible, thereby effecting considerable savings.

Hydraulic Hoisting Rig

An item that has been discussed before and should prove very valuable to the industry is the Johnston hydraulic rig, formerly called the Hydraline. This will be of aid to the industry in performing workovers by eliminating a lot of the machinery now necessary such as drum, heavy lines, traveling block, etc. This involves the principle of hydraulically lifting the string, and utilizing only one line. Hydraulic power is furnished by centrifugal pumps driven by either a gasoline engine or electric motor. The particular model now in the field and touring the country on exhibit, has a capacity of 2,500 ft. of 2½-in.

(Continued on page 77)



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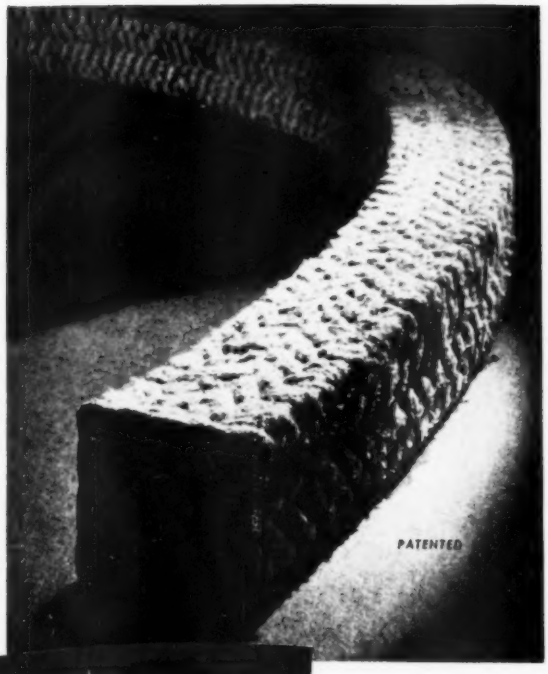

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PACKINGS, GASKETS AND OIL SEALS

An Introduction to Modern Fire Control

by George F. Prussing*

IT must be admitted that the potential danger of major disaster is higher in the natural gas-L.P.G.-gasoline business than in any other petroleum division operation. The reason is not hard to find and is well known.

Volatile, flammable liquids stored and processed under pressure present more fuel energy when released than do other oil products. The heavier oils may be higher in B.t.u.'s but the rate at which these energy units are made available as fuel is insignificant compared to that of the volatile fractions.

Initial failure of a vessel, whether it be a still, a tank, or other container, or even a pipe line or hose, seldom causes death directly. It is the vapor cloud, with its high specific gravity compared with air, and its high temperature when ignited, that does the damage both to life and property.

The ignition of a heavy vapor cloud spreading from a ruptured vessel creates the impression and some of the effects of a true explosion. Men are knocked down, derricks may be wrecked in adjoining fields, and light structures of wood and steel have their walls and sometimes even their roofs blown in. Fires spring up all

*Consulting engineer, Los Angeles. Paper presented at a recent meeting of the California Natural Gasoline Association.

***NOT MUCH LEFT.** — This series of photographs shows the bent, molten, and crumbled remnants of processing units, after fire.*

over the area wherever combustibles are present. The high temperature and amount of heat within the vapor cloud are sufficient to destroy completely the bodies of men trapped in it.

Looking back over the major disasters that have occurred in California during the past 25 years, we can trace the improvement of design from sole reliance on mechanical safety factors to the present concept that errors of human judgment must be expected and provided against. Here are some summaries of a few of these long-past disasters.

Case A.—A tank truck was being loaded at night at a gasoline plant. Liquid and vapor hoses were connected and flow was in progress. Through some human error of design or maintenance, one of the hoses blew off and knocked down the loader. By the time he recovered, the whipping hose and the dense fog cloud made it impossible to control the flow by operating the loading valve.

Soon fire in neighboring field boilers ignited the vapor cloud. True, the flow from storage tanks could be shut off manually, but the fire persisted until the truck and lines were empty and much damage done.

In this fire, six wooden derricks and seven or eight crude-storage tanks were on fire at one time, in addition to the fires within the gasoline plant. The source of ignition was more than 200 ft. from the loading rack.

Of course automatic valves, either excess flow or fusible link type, probably a combination of both, would have reduced the spill and may well have prevented the ignition by keeping the volume of gas released down to a point where natural dispersion would have taken care of it. But that was 15 years ago.

Case B.—A plant was being operated by contractor for 30 days prior to acceptance by owner. The twelve 15,000-gal. rundown tanks in one location took product from stabilizer liquid-level regulator. Column pressure was 185 psi., each tank had a 2-in. relief valve set at 20 psi., reliefs were manifolded together in a 2-in. line.

One tank ruptured, apparently through overfilling. Plant was shut down before flash occurred. Plant seriously damaged and one man killed. Nearly all tanks failed and parts of them flew as far as 200 ft. Tanks were noncode and welding was not good, but failure was in operational technique and layout of rundown facilities.

Case C.—At midnight while change of shifts was in progress, flash fire occurred at site of six 17,000-gal. storage tanks. Overflow of one tank was suspected as initial cause of liquid release. During fire other tanks in group failed successively, due to inadequate reliefs. One feature of the fire was the ignition of a flow of 8,000 M.c.f. of field gas, when the plant intake regulator let go.

Case D.—During a plant fire of unknown origin and while initial blaze was still small, operators left scene to call for help. Meanwhile, 40-psi. or higher field gas was flowing into shipping tank, to provide flooded suction to shipping pump. Tank was designed for 15 psi. and failed, long before the initial blaze could have affected its contents. Ten thousand gallons of raw natural gasoline was dumped into the initial blaze. Subsequent damage to the plant was due to the burning of this added fuel.

Here again there was no check on the operator. His skill in controlling the flow of high-pressure gas into a low-pressure vessel was all that prevented a disaster every time this method of pressuring was used. In an emergency, when he had to leave the premises, the inevitable happened.

Case E.—Vapor accumulated around the loading rack while truck was being filled. A flash occurred and truck ran over—apparently no vapor hose used. The loader was burned.

Case F.—High-stage accumulator ruptured violently, but no fire. This vessel was small—24 by 72-in.—which accounts for the lack of subsequent vapor travel. Occurrence was due to poor welding, the welds failed at about 6,000-psi. tensile stress.

Case G.—Operator closed bypass valve on compressor being put on line before opening discharge valve. A fitting flew off, the building filled with gas and ignited, wrecking a portion of the plant.

Many of the old disasters were of this general type. Perhaps the most spectacular and costly in life and property was caused by a chain of circumstances in which the infatuation of a woman for another man than her husband was apparently the last link in the chain. In that fire nine persons were killed, a dozen more were terribly burned, and the property loss went into six figures. The concussion of that blast, when the released vapors finally ignited, was felt over a radius of 40 miles. And yet the cause of the disaster was as simple as it was weird.

Reconstruction of the plant's stabilizing unit was under way but it was necessary to continue operation and to ship the raw condensate by pipe line to a nearby refinery for processing. Storage space was at a premium and tanks were being filled beyond their normal limits.

In transferring some of the product the line pump, normally used for shipping out to the refinery, was being used to fill a horizontal, low-pressure vessel. An old employe was at the throttle watching the operations, which involved filling the tank above the top of the gage glass. It was at this critical time that the operator was called to the gate and told that his wife, who had been mysteriously absent, had written her folks that the man with whom she had run away had abandoned her and that she needed money to return. The operator returned to his job physically—you can guess where he was mentally. A few minutes later liquid began to spew from the relief valve and then the pressure of the shipping pump hydraulicked the head out of the tank. The initial tank failure created only a mild shock but immediately its head was gone, the tank took off like a rocket, and spilled its contents over the entire area. The real blast came minutes later when the released vapors were ignited.

That was more than 16 years ago. Whether the lessons taught by that explosion have been written into modern operating procedures, I leave to your own best judgment. My own reaction was a distinct impression that pumps used for filling pressure vessels should be limited in pressure capacity to the safe working strength of the vessels themselves. The hydraulic shock that occurs whenever a vessel is overfilled, even though it has adequate vapor relief valves set at or slightly above its operating pressure, may seriously overstress the vessel: it may even burst it. In this case the line pump had a pressure rating out of all proportion to that of the vessel.

Operational Errors

Equipment failures that have not been complicated by operational errors are fortunately rare and prove again that the behavior of materials is far more predictable than the behavior of people. Think for a moment of all the hundreds of thousands of pressure vessels, both large and small, that operate in California, then multiply that by about 15 and you arrive at a staggering figure for the United States. And yet, out of all of these vessels, each year only a few actually fail because of improper design or, for that matter, because of poor workmanship. Vessel failures occur occasionally in surrounding fires because of lack of adequate reliefs—but far more often because of weakening of the vessel wall as the result of impinging gas blasts.

Not long ago a semitrailer loaded with four propane spheres wiped off some of its vapor piping while trying at 45 m.p.h. to negotiate an underpass at a skew crossing. The vapors took fire and a torchlike flame from number one sphere impinged on the top of number two. At the same time a flame from the ruptured vapor line from number two struck the top of number one. Of course both safety valves operated but they were set for better than 200 psi. When the metal of the spheres softened and failed under the effect of the two torches the result was heard 20 miles away. The insurance company that carried an explosion policy on the

spheres had to pay because, as the judge said: "If that wasn't an explosion, I don't know what an explosion is." He was probably right.

Where were the excess flow valves that should have stopped the flow of gas from the vapor lines? They were right there, where they should have been, in the spheres—but their **insides** were in the tool box of the truck, because they interfered with the loading of the tanks.

There have been a few failures as a result of lack of vessel inspection. I recall only one, and it caused neither fire nor other damage. It was a vertical vessel used to knock out water and it failed right around the parting line between the water and gas. Fortunately it was practically empty at the time it took off, like a giant rocket sailing off of its base and landing outside the plant. There seems to be a notion that liquefied petroleum gases are corrosion free and that is largely so, but water certainly is corrosive and must be considered in every maintenance inspection program.

I think we can safely say that the plant that is turned over to the present operating crews here in California is about as well designed as human ingenuity can make it. Certainly we are allowing good factors of safety and where these **cannot** be mathematically determined, designers have overdesigned rather than otherwise. Materials of construction are good, and weld inspection is almost perfect. Furthermore, through careful watch over regulation by governmental bodies, we have in general kept screwball restrictions to a minimum. One of the reasons why this has been possible is that most companies have taken a farsighted view of their responsibility to the industry and have allowed the true facts of every accident to be known and used for the improvement of the arts of design and operation. You haven't hidden your mistakes, either from each other or from those charged with the safety of your employes or the general public. The regard with which the engineers of the industry are held by the fire services is a fine commentary on their integrity and the attitude of the natural-gasoline companies. To my way of thinking, it is a form of good public relations and also a true measure of progress.

What then can we say to the plant operator about his plant that he can carry back to his men for their guidance in avoiding trouble? We'll have to do more than give the kind of advice that we used to see posted on the old two-solution chemical foam tanks—"these solutions must be agitated for 5 minutes before each fire."

L.P. Gases

Fire prevention consists solely in keeping liquids and heavy vapors within their containers. It is just that simple—and just that difficult. L.P. gases have three principal characteristics that make them hazardous. (1) They are under pressure; (2) they are heavier than air when vaporized; (3) they burn with high temperatures.

There is always an interval between a gas spill and the resulting fire, depending on how far the gas must go to find a source of ignition. In the interval, men must think first of themselves but they can be taught not to become panic stricken. "Get out of the vapor cloud and come back into the area on the windward side of the vapor to size up the situation," is still good advice.

"Stop the flow of fuel"—whether it is liquid or gas, is an obvious bit of advice too often overlooked. If the plant is well designed, operators will know almost instantly that they see the source of the blow, how it can be controlled. Where valves are within the vapor area and cannot be operated without entering the vapor cloud, good judgment tells one to stay out until water-fog streams are available to make the job safe. Even in the absence of fire, one or two fog streams will blow away a vapor cloud and protect the operator while he closes a valve. Of course I am speaking of operating failures of gaskets and packing, or the rupture of small lines that can be shut in. Vessel failures that dump thousands of gallons are obviously beyond the scope of this discussion. In such events there is only one sane thing for any man to do and that is to see that he, and everyone else he can yell at, gets out of the vapor area before it ignites.

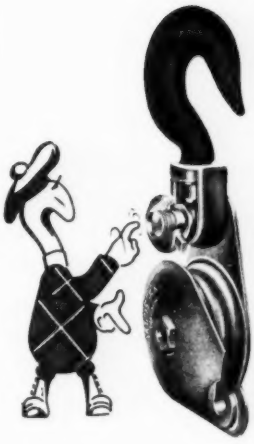
Lack of Fog Streams

Two years ago there was a spectacular fire in an eastern refinery. Ten were killed, 200 were burned, and there was $300,000 property damage. Packing blew out of a deisobutanizer reflux pump while it was being tightened up. The leak immediately flashed and the blast impinged on the column. This column failed after some time from weakened shell, and released its contents. Lack of adequate fog streams to control heat and permit shutdown was blamed for the final failure. The crowd watching the fire was burned by radiant heat. The deaths were among plant men.

In refineries and other plants where L.P. gases are handled in close conjunction with other operations, sources of ignition are far more common than they are in the typical gas plant. Perhaps that is why we have more fires and fewer disasters in refinery gas units. The time element between vapor release and ignition is usually much shorter. Hence the vapor cloud area is smaller. Hence there is less vapor fuel for the initial blast.

Another reason, however, for better experience in the refinery fires is the availability of water for fire con-

(Continued on page 78)



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The MICROLOG

A new electrical logging method for the detailed determination of permeable beds

by H. G. Doll*

THE MicroLog† has been developed primarily as a means for accurate determination of permeable beds, where the spontaneous potential log alone does not give a satisfactory answer. For that reason, this new development has found its first field of application in limestone areas. The MicroLog is, however, also of importance in sand and shale formations, if only for a more precise determination of the boundaries between successive beds, and for a better evaluation of the sand count.

Principle of MicroLogging

A MicroLog is a resistivity log recorded with electrodes spaced at short distances from each other in an insulating pad which is pressed against the wall of the drill hole. Under those conditions, the system measures the average resistivity of the small volume of material—hereinafter referred to as a "microvolume"—which is located under the pad, and which is, therefore, electrically shielded against the short-circuiting action of the mud.

Two different electrode systems, with different depths of investigation, are generally used in combination to provide two logs that are recorded simultaneously. For both electrode systems, the spacings are very small—usually 1 or 2 in. In the discussion, the systems which have the smallest and the largest depth of investigation are respectively referred to as the "short spacing" and the "long spacing."

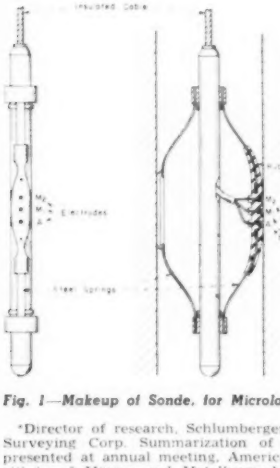

Fig. 1—Makeup of Sonde, for Micrologging.

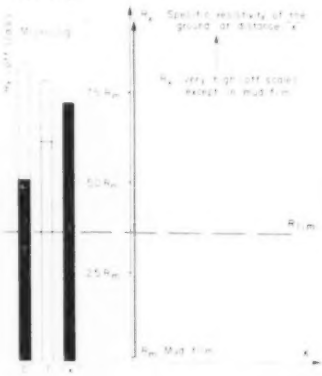

Fig. 2—HIGHLY RESISTIVE IMPERVIOUS FORMATIONS (Category I.). Because the wall of the drilled hole is generally ridged, the rubber pad cannot fit perfectly against it, and a sort of mud film may remain between the two. When the formation resistivity is very high, the rugosity of the wall, which causes a mud film to remain under the pad, almost entirely controls the microresistivities. A case of the compact impervious bed of high resistivity is illustrated. It is supposed that the formation is more than 200 times as resistive as the mud, and that there is, between the pad and the formation, a uniform mud film 1 64-in. thick. The order of magnitude of the different microresistivities is about the same, but there can be a slight departure, either positive or negative, depending on the shape of the pad, the rugosity of the wall, the ratio formation resistivity to mud resistivity, etc.

When the pad is applied to a permeable bed, the mud cake represents a substantial proportion of the microvolume. Inasmuch as the mud cake has a resistivity R_{mc} which can be estimated to be only about twice the resistivity R_m of the mud, the resistivities recorded through MicroLogging—hereinafter referred to as microresistivities—are never very high opposite permeable beds, and are appreciably related to the resistivity of the mud.

The other part of the microvolume is constituted by a fraction of the solid structure of the permeable bed whose pores are almost completely filled by the mud filtrate. The resistivity of that part of the microvolume is, therefore, not much different from the value of $F \times R_m$* which corresponds to complete mud-filtrate saturation, so that it is also directly related to the resistivity of the mud.

Because of a smaller depth of investigation, the short spacing is more influenced by the mud cake, and, therefore, generally gives a smaller apparent resistivity than the long spacing. This difference between the microresistivities recorded using two different depths of investigation is called "departure," and is said to be positive when the longest spacing gives the largest resistivity. When there is a large percentage of "positive departure," the formation can almost certainly be interpreted as permeable.

When the pad is applied to an impervious bed of low resistivity, both spacings measure substantially the same resistivity, which is that of the formation, and there is no appreciable departure between the microresistivity curves. If the resistivity of the impervious bed is very high, the microresistivities can differ appreciably from the formation resistivity, but they are both higher than the limit R_{lim} above which beds should be classified as impervious.

For intermediate values of the resistivity, and because of the limited dimensions of the pad, a departure between the microresistivity curves is sometimes observed on impervious beds, but, in that case, the departure is negative, i.e., the longest spacing gives the smallest value of the apparent resistivity, so that there can be no confusion in the interpretation.

Description of MicroLog Equipment

The resistivity of the small volume of ground surrounding the electrodes can be measured, for example, by sending a current of known intensity I through electrode A (Fig. 1), and by measuring, with a galvanometer, the potential difference created by that current between electrode M_1 and a reference electrode. This

*Director of research, Schlumberger Well Surveying Corp. Summarization of paper presented at annual meeting, American Institute of Mining and Metallurgical Engineers, New York, February 13-15.

†MicroLog: Trade mark, Schlumberger Well Surveying Corp.

*F is the formation factor, as defined by Archie.[3]

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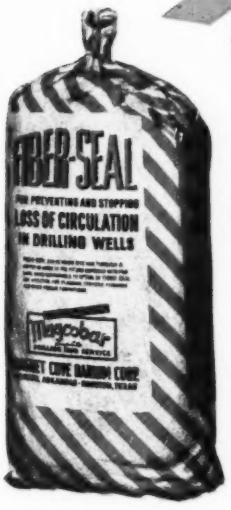

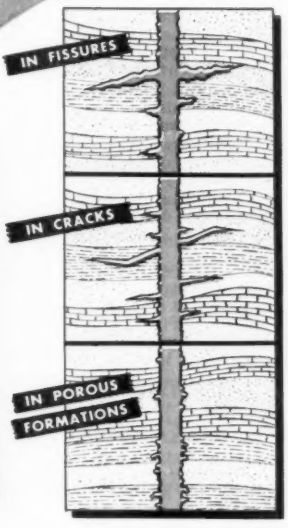

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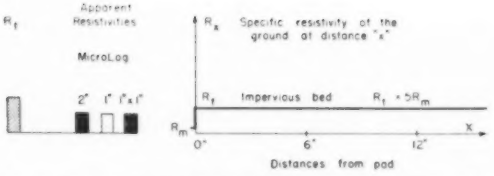

Fig. 3—(Above) IMPERVIOUS BEDS OF LOW RESISTIVITY (Categories I_1 and I_2). This is a case of an impervious bed whose resistivity has been assumed to be five times the resistivity R_m of the mud. The resistivity diagram on the right of the figure illustrates the fact that the resistivity is uniform, and does not vary with the distance from the pad, as would occur for a permeable bed. The rectangles at the left represent, at the same scale, the respective values of microresistivities that would be obtained, and the formation resistivity R_t. The apparent resistivities measured on the different microresistivity logs are slightly lower than the true resistivity R_t of the formation. When the resistivity of the impervious bed is not much different from that of the mud, there is practically no departure between the microresistivity curves (Category I_1). When, on the contrary, the resistivity of the impervious bed is appreciably higher than that of the mud, there is generally a substantial negative departure. (Category I_2).

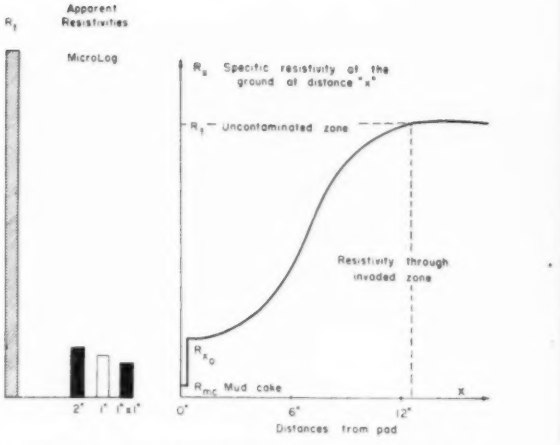

Fig. 4—(Right) PERMEABLE BEDS, HIGH RESISTIVITY, INVADED BY MUD FILTRATE (Category P_2). The resistivity R_m of the mud cake in this example has been assumed to be twice the resistivity R_m of the mud. The resistivity R_{x_0} immediately behind the mud cake, where the permeable bed should be practically saturated by mud filtrate, has been taken equal to 10 times R_{mf}; this would correspond to a value of 10 for the formation factor, if the saturation by mud filtrate is complete[2], and if the pores are reasonably free of conductive solids.[3] On the left are represented, at the same scale, the approximate values of the microresistivities that would be obtained in that particular case from the Microlog. As can be seen, the departure is positive and quite substantial. This result is general when R_t is larger than R_{x_0}. A large positive departure between microcurves is usually characteristic of a permeable bed.

is very similar to conventional electrical logging with the "normal device,"[1] which is also a two-electrode system, except that the spacing is much smaller, so that the depth of investigation is reduced accordingly.

Similarly, a slightly larger volume of ground can be taken into account by measuring, with a galvanometer, the potential produced at electrode M_2 by the same current. This is an important feature of the system; it is possible not only to measure the average resistivity of the ground under the pad, but also to determine whether or not the resistivity varies with depth from the pad. This determination is of significance, for a resistivity variation with depth from the pad usually occurs when there is a mud cake.

Other electrode combinations can, of course, be used. When a current is sent through electrode A, it is also possible to measure the potential difference between electrodes M_1 and M_2. This corresponds to a three-electrode combination similar to the "lateral device"[1] commonly used in conventional electrical logging. The three-electrode system A M_1 M_2 is more influenced by the mud cake than the two-electrode system A M_1, so that a combination of the lateral A M_1 M_2 and the normal A M_2 would generally give a larger departure opposite permeable beds than a combination of the two normals.

On most of the pads presently in use, the three electrodes are placed on a vertical line, in the middle of the pad, with a spacing of 1 in. between the successive electrodes. Three electrode combinations are thus obtained, which are listed herebelow for reference:

Measuring device	Reference
A M_1 normal	1 in. normal (or 1 in.)
A M_2 normal	2 in. normal (or 2 in.)
A M_1 M_2 lateral	1 by 1 in. lateral (or 1 by 1 in.)

Interpretation of MicroLogs

Interpretation of MicroLogs will be aided by placing the different cases usually encountered in practice into categories, which are illustrated by schematic drawings (Figs. 2, 3, 4, and 5). Each category will be given a reference letter, namely, I_1, I_2, I_3 (impervious beds), and P_1, P_2 (permeable beds). These letters will be placed on the field examples exhibited at the levels of each of bore hole which can be considered as belonging to the corresponding category.

It is possible to derive a certain number of simple rules of interpretation for the microresistivity logs of formations, whereby two electrode combinations of different depths of investigation have been run simultaneously. These rules, which will apply in the great majority of cases, are schematically represented in Fig. 6.

It is wise to check the trend of the S.P. log in any case; unless this log is completely flat, it should always be possible to determine the trend of the S.P.

When the mud is saturated with salt, the S.P. curve is completely flat. In that case, however, there is generally little doubt about the interpretation of the MicroLog, because the permeable beds, which are invaded by the saturated mud filtrate, are the only ones to give microresistivities lower than the limit R_{mf}, which itself is lower than the true resistivity of all impervious beds. The interpretation can then be based on the observation of the lows in the MicroLog, while a good positive departure, if it exists, brings a useful confirmation.

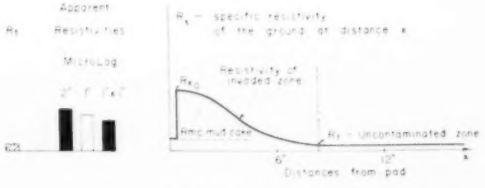

Fig. 5—PERMEABLE BEDS, LOW RESISTIVITY, WITH MODERATE INVASION BY MUD FILTRATE (Categories P_1 and P_2). When the mud cake has an appreciable thickness, and when, simultaneously, the depth of invasion is large enough, the microresistivities measured with the different electrode combinations show good positive departures (Category P_2). For a smaller penetration of the mud filtrate into the permeable bed, the departure would disappear (Category P_1). For still less invasion, the departure might even be slightly negative. The spread of the invaded-zone resistivity curve decreases with depth of invasion of mud filtrate.

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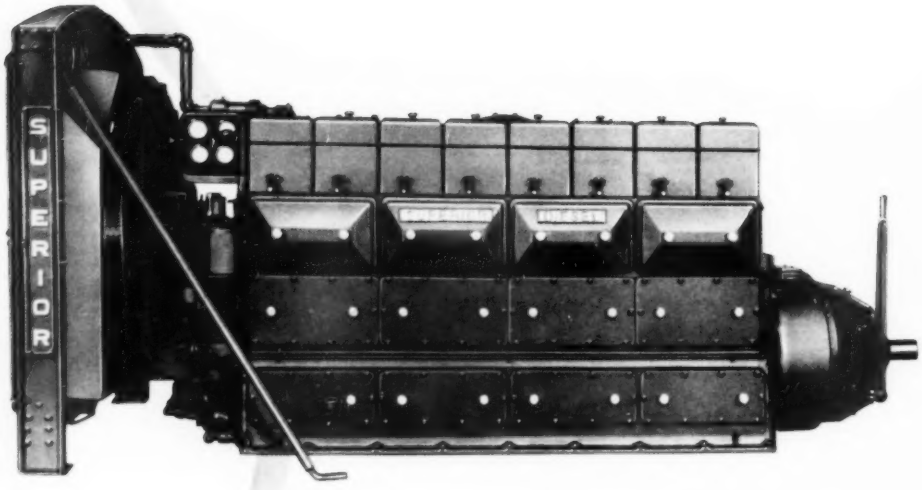

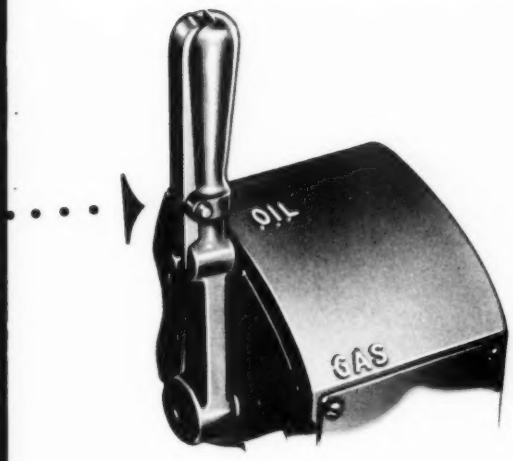

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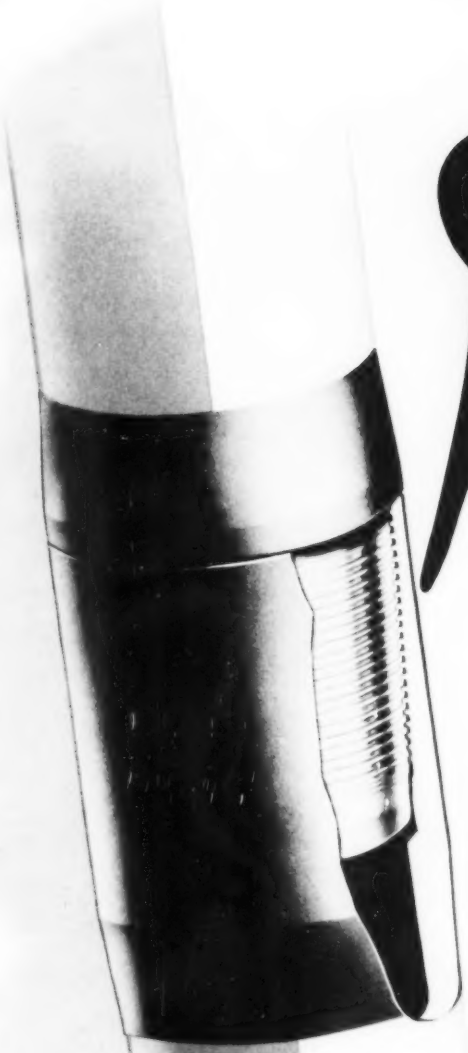

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$R_{(x)} > R_{lim}$			Impervious	Category I_1
$R_{(x)} < R_{lim}$	$R_2 < R_{(x)}$ large negative departure		Impervious	" I_2
	$R_2 \cong R_{(x)}$ departure nil or small	S.P. trend positive	Impervious	" I_3
		S.P. trend negative	Permeable	" P_1
	$R_2 > R_{(x)}$ large positive departure		Permeable	" P_2

Fig. 6—CLASSIFICATION OF MICROLOG DATA FOR INTERPRETATIVE PURPOSES: R_{lim} equal to about

10-15 R_m for fresh mud.
20-30 R_m for average mud.
40-50 R_m for very salty mud.

S.P. trend positive if convexity S.P. log toward positive, or if S.P. log on positive limit.
S.P. trend negative if convexity S.P. log toward negative, or if S.P. log on negative limit.

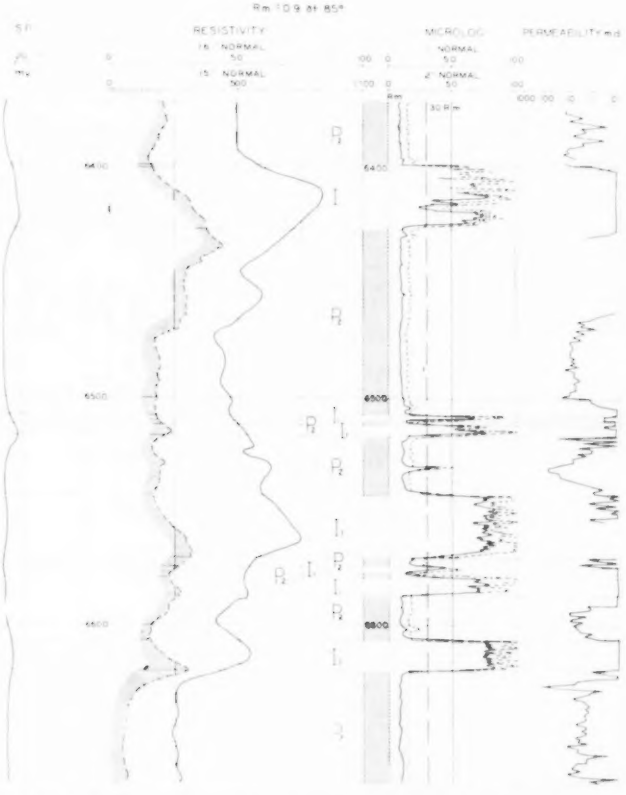

Fig. 7—Example of Microlog recorded in a sequence of shales and limestone. In this instance, most of the compact beds give rise to microresistivities which are definitely higher than 30 R_m, so that the discrimination between permeable and impermeable formations is particularly easy. The permeability record, provided by core analysis, was available in this well and is reproduced in the figure, as a check on the indications of the electrical logs.

Interpretation is also facilitated by the consideration of the conventional resistivity log, insofar as this log makes it possible to evaluate the true formation resistivity R_t.

When the value of the microresistivity R_{micro} is less than R_{lim}, it reasonably can be assumed that a bed cannot be impervious unless R_t is comprised between values respectively equal to about R_{micro} and 2 R_{micro}. When R_t is between the two values, the S.P. log will generally give a definite anomaly that will make the interpretation safe. When R_t is not between the above limits, there is a strong probability that the bed is permeable.

In the particular case of a highly resistive permeable bed, with a comparatively conductive invaded zone, and interbedded with shales and highly resistive compact formations, the S.P. log may show no appreciable deflection with respect to the shale line. But, in that case, a good correct departure should be obtained from the MicroLog.

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3. G. E. Archie, The Electrical Resistivity Log as an Aid in Determining Some Reservoir Characteristics, Petroleum Technology, Vol. J, 1942.

4. H. G. Doll, J. C. Legrand, E. F. Stratton, True Resistivity Determination from the Electric Log—Its Application to Log Analysis, The Oil and Gas Journal, Vol. 46, No. 20, September 20, 1947, p. 297 ff.

5. H. W. Patnode and M. R. J. Wyllie, The Presence of Conductive Solid in Reservoir Rocks as a Factor in Electric Log Interpretation, A.I.E.E. meeting, San Antonio, October 5-7, 1949.

6. H. T. Byck, The Effect of Formation Permeability on the Plastering Behavior of Mud Fluids, A.P.I. Drilling and Production Practice, 1940, p. 40.

BOOKS

COAL, COKE, and COAL CHEMICALS. By Philip J. Wilson, Jr., and Joseph H. Wells. Published by McGraw-Hill Book Co., 330 West 42nd Street, New York 18. 509 pp. $8.

Here is an authoritative treatise on coal, high-temperature coking, recovery of coal chemicals from coke-oven gas, and distillation of tar. Each phase of the industry is systematically covered, and other coal-carbonization processes, gas retorts, and lower-temperature coking are described briefly. Fuels in general, and the principles of combustion also receive attention, and in the closing chapters, consideration is given to the economics of the industry. The treatment of coal-chemical recovery is most comprehensive, and the authors present a modern coverage of the economics of the industry. For reference convenience there is a bibliography of literature for further reading and a list of visual aids pertinent to the subject.

Analyses of Crudes from Middle East, South America, Canada

ANALYSES of crude oils from some fields in the Middle East, South America, and Canada are presented in this summarization of data from a report of investigations recently published by the Bureau of Mines, U. S. Department of the Interior. The tabulation shows information concerning the source of the samples and some important characteristics of the crude oils.

Production of crude oil from these areas for the past 3 years is as shown:

Area	Barrels daily* 1947	1948	1949
Middle East	837,900	1,138,000	1,367,100
South America	1,418,400	1,570,800	1,571,600
Canada	29,900	32,500	58,300

*Data from The Oil and Gas Journal's International Issue, December 22, 1949, page 179.

Present indications are that production of crude petroleum from all these regions will continue to increase. The major portion of the Canadian increase is attributable to two fields—Leduc and Redwater—discovered during the past 2 years.

The report contains 35 analyses of samples of crude oil from 33 fields in the Middle East and South America, and from Canada. The samples were analyzed according to the routine procedure used by the Bureau of Mines. In addition, the report has a table giving information on the year of discovery and 1948 production data for the fields represented. Also shown are a finding list and a table of reference of published analyses of foreign crude oils analyzed by the Bureau of Mines.

A copy of report "Analyses of Some Crude Oils from the Middle East, South America, and Canada," by O. C. Blade, E. L. Garton, and C. M. McKinney may be obtained without charge upon application to Bureau of Mines, Publications Distribution Section, 4800 Forbes Street, Pittsburgh.

SUMMARY OF REFINING DATA FOR FOREIGN CRUDE OILS

		Properties of crude oil					Total gasoline and naphtha		Kerosine distillate		Gas oil		Approximate summary: Nonviscous lubricating distillate		Medium lubricating distillate		Viscous lubricating distillate		Residuum		
Continent, country and field	Item	Gravity, °A.P.I.	Color	Sulfur, per cent	Viscosity at 100° F.	Carbon residue, per cent	Per cent	°A.P.I.	Per cent	°A.P.I.	Per cent	°A.P.I.	Per cent	°A.P.I.	Per cent	°A.P.I.	Per cent	°A.P.I.	Per cent	°A.P.I. Gravity	Carbon residue, per cent
ASIA:																					
Iran:																					
Agha Jari	1	36.0	G.B.	1.36	45	3.9	28.5	60.5	9.6	42.6	12.9	35.2	9.7	31.1-25.0	6.3	25.0-24.3	0.5	24.3-24.2	27.8	12.9	12.0
Central Area	2	38.0	G.B.	1.20	40	2.8	32.2	61.0	10.8	43.8	14.6	35.8	9.7	31.7-26.6	6.0	26.6-24.2	1.1	24.2-23.7	21.5	12.9	11.2
Gach Saran	3	33.0	G.B.	1.66	55	5.6	27.2	61.5	8.3	42.3	13.0	34.8	8.4	31.0-25.6	6.6	25.6-23.0	0.2	23.0-22.8	32.1	10.1	15.0
Iraq:																					
Kirkuk	4	36.6	B.B.	1.93	42	4.0	35.5	63.7	9.0	44.5	14.9	36.6	11.2	32.5-26.1	3.4	26.1-24.2	1.7	24.2-23.5	23.3	10.4	14.6
Saudi Arabia:																					
Abqaiq	5	38.0	G.B.	1.30	40	2.9	32.0	62.3	10.5	44.3	14.9	36.4	10.9	32.1-26.6	5.6	26.6-24.7			24.0	15.3	10.3
Abu Hadriya	6	32.3	G.B.	1.69	50	4.1	23.3	57.4	11.3	44.7	17.9	35.8	12.0	31.0-26.1	4.3	26.1-24.7			28.6	13.0	12.8
Damman	7	35.6	G.B.	1.54	42	3.1	29.0	58.4	11.3	43.8	18.3	35.8	10.9	31.1-26.3	6.3	26.3-24.0			23.2	14.1	11.7
Qatif	8	27.7	B.B.	2.57	72	6.7	19.3	58.4	9.7	44.7	17.2	35.2	10.6	30.2-24.5	6.9	24.5-21.5			36.1	10.0	16.6
Qatif	9	28.2	G.B.	1.59	60	2.7	31.4	59.7	10.1	44.7	16.3	36.0	10.1	31.3-26.3	6.4	26.3-23.7			22.4	14.4	10.4
SOUTH AMERICA:																					
Chile:																					
Manantiales (Spring Hill)	10	40.9	G.B.	.05	39	.4	27.3	56.7	13.3	43.0	26.3	37.2	17.5	35.0-31.3	1.3	31.3-31.0			13.3	24.0	2.0
Colombia:																					
Cantagallo	11	19.8	B.B.	1.98	1,250	10.1	6.7	52.7	2.6	40.6	16.6	34.2	7.9	29.5-26.1	5.3	26.1-24.0	12.9	24.0-21.3	47.3	9.3	19.8
Carbonera	12	22.3	B.B.	1.34	150	7.2	16.6	47.4			20.2	31.1	7.1	25.0-21.3	5.2	21.3-19.5	10.7	19.5-18.4	40.1	11.1	16.7
Casabe	13	20.8	B.B.	1.08	950	8.5	5.8	51.1			18.7	34.0	10.2	29.3-25.7	5.4	25.7-23.7	10.5	23.7-21.0	47.9	11.6	16.6
Casabe	14	20.5	B.B.	1.06	660	8.0	6.1	48.5			17.9	33.0	10.6	28.0-23.3	6.8	23.3-21.3	12.7	21.3-19.7	45.1	12.5	12.6
Colorado	15	40.2	G.B.	.25	39	1.6	33.6	59.7	10.5	44.1	15.8	37.2	11.2	34.0-30.8	6.7	30.8-29.1			20.7	19.4	6.8
El Difícil	16	41.7	NPA 7	.07	34	.3	40.8	55.2	6.4	41.9	27.4	35.4	11.9	31.7-27.1	4.9	Indeterminate			7.1	17.0	4.1
Galan	17	19.7	B.B.	1.11	1,100	8.4	5.5	51.8			17.8	33.2	8.6	29.7-24.0	6.4	24.0-22.3	12.3	22.3-20.2	48.4	10.9	16.4
Infantas	18	29.5	B.B.	.89	96	5.6	19.1	59.5	8.1	41.9	12.8	35.2	10.4	31.7-27.3	6.1	27.3-25.2	2.8	25.2-24.2	39.5	14.8	12.9
La Cira	19	24.3	B.B.	.96	220	6.4	12.1	54.9	2.9	40.2	16.2	34.0	7.2	29.5-25.2	6.5	25.2-23.3	0.7	23.3-22.0	43.0	13.5	13.5
Las Monas (La Salina)	20	22.8	B.B.	1.15	300	5.4	8.4	50.4			20.1	32.8	9.9	28.9-24.2	6.5	24.2-22.3	8.1	22.3-21.6	46.7	14.5	11.0
Petrolea	21	47.2	NPA 4½	.12	34	.2	48.9	59.5	11.9	43.8	16.3	37.4	9.2	34.0-31.3	3.6	31.3-30.0			9.8	24.3	2.3
Tibu	22	32.1	B.B.	1.03	66	4.9	21.9	60.5	13.3	42.3	8.1	35.2	9.8	33.2-28.8	6.6	28.8-25.9			38.1	16.0	11.5
Tibu	23	48.1	NPA 5½	.12	32	.2	51.4	61.3	18.7	43.0	8.3	36.0	8.0	34.6-31.1	3.4	31.1-29.7			9.0	23.7	2.7
Velasquez	24	28.2	B.B.	.85	110	4.8	16.6	59.5	8.1	42.6	14.0	35.2	11.3	31.5-26.8	7.0	26.8-24.3	6.3	24.3-22.5	35.4	13.2	12.3
Peru:																					
La Brea-Parinas "Low Cold Test"	25	34.8	B.G.	.12	41	1.7	38.0	55.4			20.1	34.0	8.6	29.7-25.2	4.9	25.2-23.3	7.0	23.3-20.7	20.7	16.1	7.4
La Brea-Parinas "High Cold Test"	26	37.6	B.G.	.08	40	1.3	33.7	55.4	12.6	41.1	16.0	36.6	11.1	32.4-29.1	6.7	29.1-26.6	1.9	26.6-25.9	17.8	15.9	6.6
Venezuela:																					
Guario	27	43.2	Green	.13	50	.7	40.4	59.5	4.0	42.1	19.5	35.2	13.4	Indeterminate					19.5	22.8	3.3
Lagunillas	28	17.1	B.B.	2.18	1,550	11.2	7.5	52.0			16.3	32.8	8.8	28.8-22.8	6.4	22.8-20.8	8.6	20.8-18.7	51.0	7.5	19.9
Mercedes (light)	29	34.6	D.G.	.66	44	2.2	24.9	52.5	14.8	41.3	20.0	35.4	12.9	32.7-29.1	5.8	29.1-27.9			21.3	16.4	9.4
Mercedes (heavy)	30	25.0	B.B.	1.76	120	7.2	13.7	48.8	4.9	42.1	22.4	35.2	12.0	30.8-26.3	8.6	26.3-24.5			37.6	9.9	17.2
Oficina	31	38.0	B.B.	.59	38	2.8	33.6	58.2	5.2	42.3	22.2	35.0	10.6	30.8-27.3	5.8	27.3-24.5			16.5	13.3	12.7
Tucupita	32	16.5	B.B.	1.05	2,500	11.7	2.6	50.6	1.4	40.0	11.9	31.7	11.6	28.0-22.8	5.0	22.8-21.3	9.5	21.3-19.0	56.8	8.7	19.5
NORTH AMERICA:																					
Canada:																					
Leduc	33	39.8	B.G.	.30	38	1.7	36.7	59.2	10.2	41.5	14.0	35.4	9.8	32.5-28.2	6.4	28.2-25.6			19.9	17.3	7.6
Leduc	34	40.9	B.G.	.30	37	1.5	36.0	59.5	9.6	41.7	16.0	35.6	9.3	32.8-27.9	6.4	27.9-25.9			18.7	17.9	7.1
Redwater	35	34.8	G.B.	.55	45	4.1	29.2	59.2	4.3	42.3	18.6	36.2	9.7	32.1-27.3	6.8	27.3-24.5			28.1	13.3	12.7

PRODUCING FORMATION, AGE, AND AVERAGE DEPTH OF THE CRUDES REPRESENTED BY THE ABOVE ANALYSES ARE

Item	Producing formation and age	Avg. depth (ft.)
1	Asmari limestone, Oligocene-Lower Miocene	4,500
2		
3	Asmari limestone, Oligocene-Lower Miocene	3,000
4		
5		
6	Arab limestone	10,055
7		
8	"C" member, Arab limestone	
9	"D" member, Arab limestone	
10		7,350
11	Cantagallo sand, Eocene	6,266
12	Barco sand, Eocene	1,935
13	"A" sands, Colorado formation, Oligocene	2,612
14	"B" sands, Mugrosa formation, Oligocene	4,458
15	C-Zone sand, La Paz formation, Eocene	3,758
16	El Difícil limestone, Oligocene	5,830
17	A-Zone sand, Upper Colorado formation, Oligocene	1,604
18	C-Zone sand, La Paz formation, Eocene	4,139
19	C-Zone sand, La Paz formation, Eocene	5,205
20	Unnamed sands	1,800
21	Zone 4-Uribante sand and limestone, Cretaceous	1,212
22	Barco sand, Eocene	4,858
23	Uribante sand, Cretaceous	8,371
24	Guaduas sand, Eocene	7,032
25		
26		
27		
28		
29	"A" sand, Tertiary	4,300
30	"C" sand, Tertiary	
31		
32		
33	D-2 (Leduc) zone, Upper Devonian	5,050
34	D-3 zone, Upper Devonian	5,300
35	D-3 zone, Upper Devonian	5,100

Colors of crude oils in this table are designated as follows: green, no abbreviation; dark green, D.G.; brownish green, B.G.; greenish black, G.B.; brownish black, B.B.; NPA, numbers S.U. viscosity range 50-100 seconds at 100° F.; S.U. viscosity range 100-200 seconds at 100° F.; S.U. viscosity range above 200 seconds at 100° F. Composite sample representative of the following fields as indicated: Haft Kel, 68.0 per cent; Lali, 4.9 per cent; Masjid-i-Sulaiman, 22.2 per cent; and Naft Safid, White Oil Springs, 4.9 per cent.

VESSEL DIVISION

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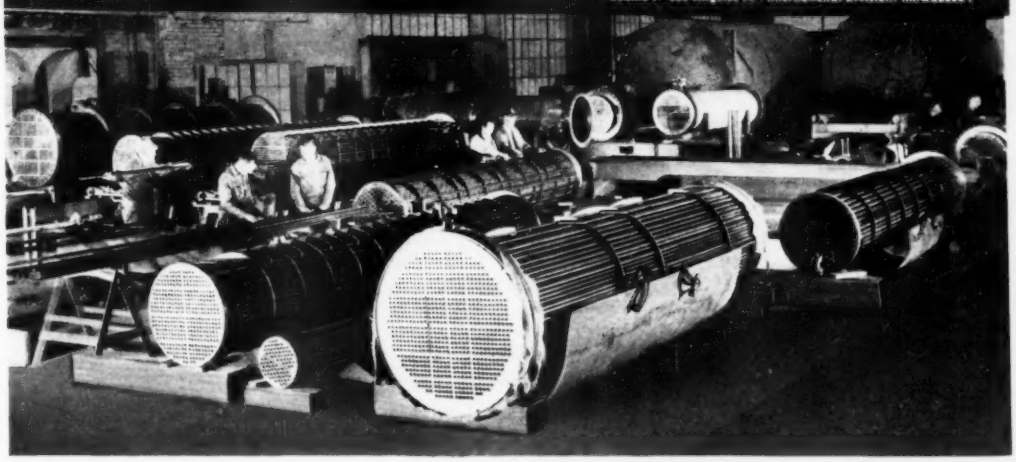

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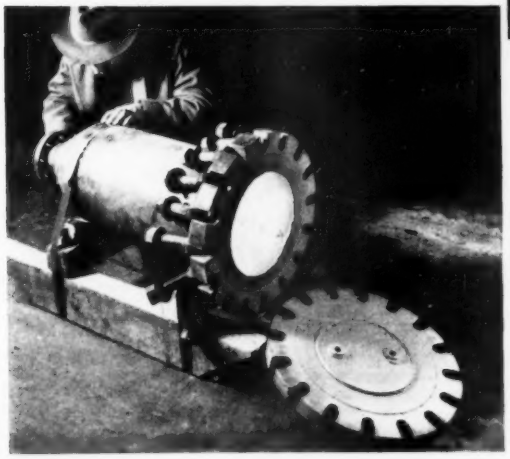

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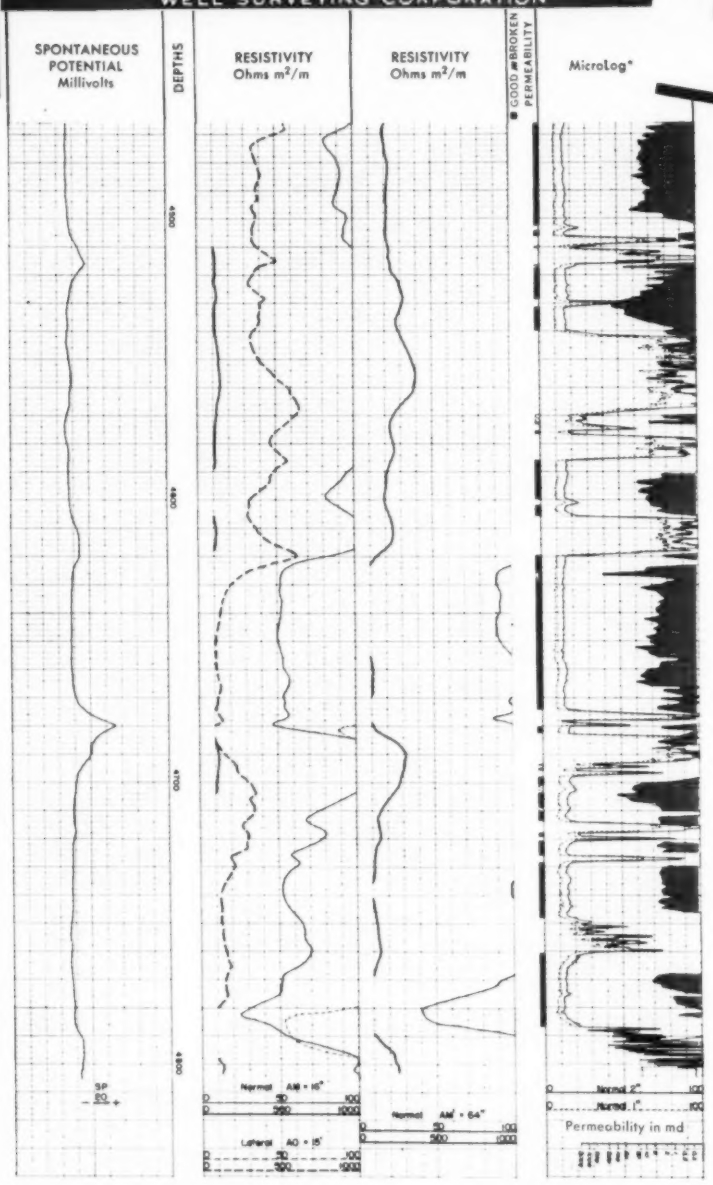

Mud (Water & Clay):
R_m = 1.00 ohms approximately

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Spacings: AM = 16"
AM' = 64"
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PLANNING MODERN GAS-COMPRESSOR STATIONS

by Tyler G. Hicks*

3. Compressor Cooling

WITHOUT use of well-planned and installed auxiliary equipment, the modern gas-compressor station could not operate at its rated capacity for long periods of time. Since almost constant operation under maximum or part load is required of nearly all gas-compressor stations, auxiliary equipment is now regarded to be as important as the main compressors. For convenience in discussion and station planning, auxiliary equipment can be classified under the following general headings: (1) engine and compressor cooling systems, (2) water-treatment apparatus, (3) oil coolers, (4) air filters, (5) inter and after-coolers, (6) safety devices, (7) engine exhaust system, (8) station heating system, and (9) miscellaneous equipment. Since complete statements of the general design problem are not readily available, it is felt that a discussion which presents details of design experience and present practice will be of interest to all concerned.

*Consulting engineer, New York City

Water-Cooling Systems

The best type of cooling system for a given gas-compressor station depends upon a great many factors, a few of which are: (1) amount of water available in station locality, (2) quality of available water, (3) allowable temperature rise through engine and compressor cylinders, (4) type of piston-cooling system used in engine, if any, and (5) funds available for station construction. There are other factors but the ones listed here have the greatest influence on system choice.

Choice of systems.—Basically, the choice is between an open or a closed cooling system, Fig. 1. Open systems are sometimes called single-circuit systems, a term defining some of their advantages. A single circuit, usually, requires less footage of piping, fewer pumps, and fewer fittings, which are economic advantages. However, when a cooling pond or tower is used to reduce the temperature of the water, evaporation and windage losses require daily makeup of 4 or 5 per cent of the water cooled, depending on weather conditions. Makeup water, unless filtered and treated, causes a gradual buildup of solids in the tower basin. These solids must be removed periodically or the water treated to prevent entrance of the solids into the system. Treatment occurs before the water is fed to the system. Regardless of which removal method is used, basin drainage or water treatment, there is some cost associated with it. Drainage usually requires labor other than station operators; treatment requires materials and a portion of the operator's time. In many cases these additional costs will soon nullify any initial savings which may have resulted from less piping footage, and fewer fittings and pumps.

Closed systems.—The closed cooling system, Fig. 1B, requires at least one additional pump, plus, usually, more piping footage and a greater number of fittings. However, jacket scale formation and makeup water are largely eliminated. With the jacket circuit filled with soft water when the station is first started, piston seizure and scaling problems will be unknown during the life of the station. Leaks in the jacket circuit must be avoided because the soft water may be difficult to replace.

Another advantage of closed systems is the absence of oxygen in the jacket water. In an open system the cooling water often absorbs oxygen from the air during its passage through the cooling tower or pond. Later, in the engine jacket, the higher temperatures cause oxygen bubbles to leave the water and attack nearby castings and steel parts. In addition, the solids which accumulate in the basin of an open cooling system quickly form scale when exposed to the high temperatures existing in engine and compressor cylinder water jackets. Hence, corrosion and scaling are two common dangers associated with open cooling systems.

Type of system to be used.—This brief discussion indicates, rather clearly, the limits of the open system. It can be said that in localities where only scale-forming water is available for engine-cooling systems, the closed system should be used for all permanent installations unless water-treating materials or labor are ex-

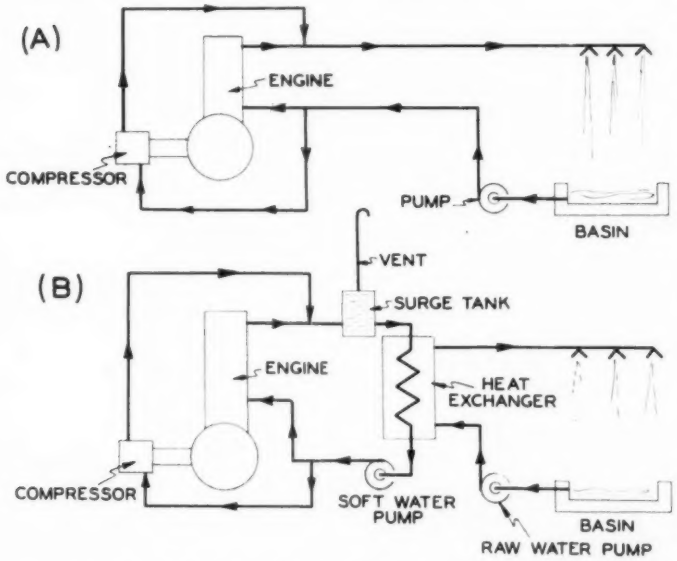


Fig. 1—(A) Open cooling system used for engine and compressor. Although this type system has a low first cost, there are several operating hazards associated with its use. (B) Closed cooling system equipped with a surge tank. Tank permits expansion of the heated water and provides storage space for water which might be required during periods of heavy load. The closed system is best for all permanent installations in regions with poor quality water.

tremely low in cost. For temporary installations, the open cooling system is usually lower in cost, has fewer operating parts, and is therefore more desirable than closed systems using a pond or tower. Where an unlimited supply of soft water is available, the open system is suitable for both permanent and temporary installations. However, such supplies are not often found near the site of usual compressor stations.

Heat to Be Removed from Jacket Water

Once the type of cooling system has been chosen, the amount of water which must be circulated can be determined. Cooling water quantity is a function of fuel burned, allowable inlet and outlet temperatures for the water, and engine horsepower. With a diesel engine for compressor drive, it is common practice to assume that an average of 3,000 B.t.u. per brake-horsepower-hour must be absorbed by the cooling water. Gas engines which use 1,000 B.t.u. per cubic foot natural gas for fuel will reject anywhere from about 3,000 to 3,500 B.t.u. per brake-horsepower-hour to the cooling water, depending on local conditions.

When the total heat rejected by the engine to the cooling water and the allowable temperature rise of the water are known, the quantity of cooling water required per unit time is:

$$\text{g.p.m.} = \frac{Q}{500\,(\Delta t)} \qquad (1)$$

where

g.p.m. = cooling water flow rate, gallons per minute
Q = heat rejected to the cooling water by the engine, B.t.u. per hour
Δt = temperature rise of the cooling water during passage through the engine, °F

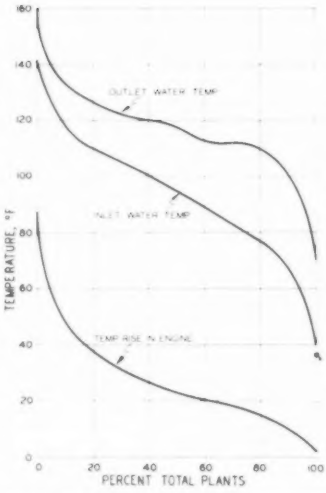


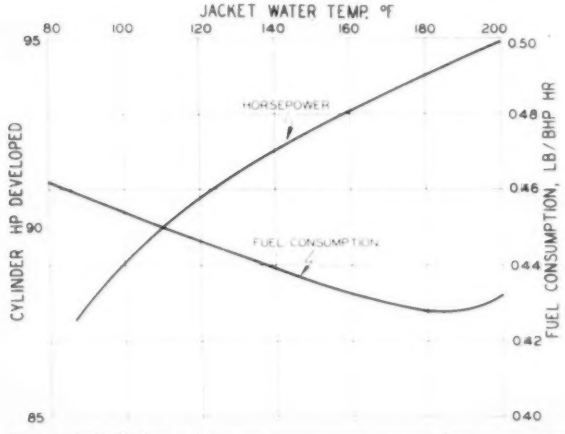
Fig. 2—Inlet, outlet, and jacket temperatures commonly used in gas-compressor-station work. Recommended temperatures for various operating conditions are given in the text of this article.

Since heat-rejection quantities are governed by engine design and can be rather closely approximated, the only unknown on the right side of the equation is the cooling-water temperature rise. Because jacket-water temperatures suitable for gas-compressor-station work have been the subject for much discussion for the past 50 years, a brief presentation of major findings will aid selection of proper values.

Temperature trends.—When internal-combustion engines were first introduced for powering gas compressors, open-type cooling systems were almost universal. At first, jacket-water temperatures were allowed to rise 30° to 100° F. but it was soon found that severe scale deposits and cases of piston seizure were common. Jacket-water temperature rise was quickly reduced and today a difference of 15° to 20° F. is most frequently used. The temperature of the cooling water leaving engines fitted with open cooling systems is now generally held at about 120° F. With closed cooling systems, engine-outlet temperatures are held at anywhere between 140° and 160° F. Experiments with units using high jacket-water temperatures have shown that there are three definite advantages when scale-forming ingredients are not present in the jacket water. These are: (1) improved engine output resulting from decreased lubricating-oil drag and cylinder-liner distortion, (2) reduced liner wear, and (3) better heat-recovery possibilities for station heating.

Perhaps the outstanding advantage of high jacket-water temperatures is reduced liner wear. Corrosion is often thought to be one of the major causes of liner wear. When a fuel containing hydrogen burns, a small amount of water is formed in the products of combustion. This water remains in the vapor state until it comes into contact with metal surfaces at a temperature below its dew point, whereupon it condenses. The moisture thus formed can cause serious corrosion and is usually termed "liner wear." If sulfur is also present in the fuel, a similar release of gases and condensation will occur. Then, mixture of the sulfur and water will form sulfuric acids and the corrosion problem becomes worse. Higher jacket-water temperatures are believed to reduce water vapor and sulfur vapor condensation, with a resulting decrease in liner corrosion.

Estimating outlet temperatures.—Fig. 2 summarizes inlet, outlet, and



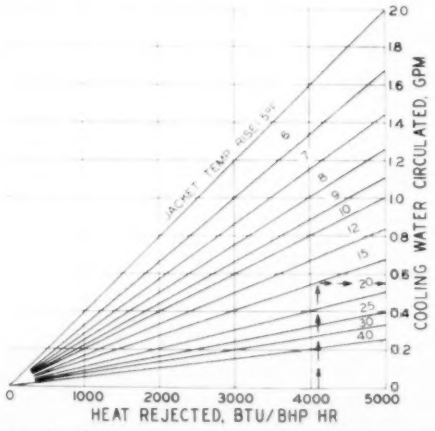


Fig. 3—(Left) Higher jacket-water temperatures increase horsepower output and reduce fuel consumption of internal-combustion engines driving gas compressors. Fig. 4—(Right) Chart for determining the quantity of cooling water which must be circulated to remove a given quantity of heat with a specified rise in jacket water temperature. Follow arrowed line to solve any problem of this nature.

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jacket temperature-rise values used in a number of gas-compressor stations. Study of the curves shows that more than half the stations operate with jacket-water temperature rises between 10° and 30° F. About two-thirds keep inlet temperature at 90° F., or higher. Outlet temperatures vary all the way from 70° to 160° F., with almost 80 per cent of the stations operating at outlet temperatures of 110° F. and higher. Of the 140 odd stations used for compiling these data, about half were fitted with open cooling systems and the other half with the closed type.

When large, slow-speed diesels are used for gas-compressor drive, the design outlet temperature for the cooling water is often estimated from the empirical relation:

$$t = 190 - 4d \qquad (2)$$

where

t = design outlet temperature for cooling water, °F.

d = engine cylinder diameter, in.

As a rule-of-thumb basis for gas-compressor-station design, it can be said that outlet temperature should not in general exceed 160° F.; temperature rise should be held to a maximum of 30° F., and preferably less. Inlet temperature is a function of the quantity of water circulated, heat exchanger used, and jacket-water outlet temperature. When the outlet temperature and jacket rise are known, the inlet temperature can be found by subtraction. For slow-speed diesels up to about 2,000 hp., outlet temperatures should be held at 140° F., or lower. Fig. 3 shows some of the results obtained by use of higher jacket-water temperatures in typical internal-combustion engines.

Additional cooling.—The discussion thus far has neglected lubricant and exhaust-manifold cooling. For most gas and diesel engines used in gas-compressor stations, lubricant cooling will add 700 to 900 B.t.u. per brake-horsepower-hour rejected to the cooling water. Exhaust-manifold cooling will further increase the heat rejected by 200 or more B.t.u. per brake-horsepower-hour. Thus, for the typical diesel with jacket water used to cool lubricating oil and the exhaust manifold, total heat rejected to cooling water = 3,000 + 800 + 200 = 4,000 B.t.u. per brake-horsepower-hour. Heat rejection by a gas engine will be equal to or slightly more than this value, according to operating conditions and engine efficiency.

Fig. 4 is convenient for determining the quantity of cooling water required for engine cooling when the total heat rejected and the cooling-water temperature rise are known. Use is as follows:

Problem.—Three 1,000-horsepower gas engines will be used to drive flare-gas compressors in a pipe-line pumping station. Total heat rejected by the engine jackets, lube-oil coolers, and exhaust manifold is estimated to be 4,100 B.t.u. per installed brake-horsepower-hour. Determine the amount of water which must be circulated for main engine cooling purposes if the jacket-water temperature rise is assumed to be 15° F.

Solution.—Total installed horsepower = 3 (1,000) = 3,000. Since 4,100 B.t.u. per brake-horsepower-hour is rejected and the cooling-water temperature rise is 15° F., enter Fig. 4 at 4,100 B.t.u. on the heat-rejected scale and project up to the 15° F. temperature rise curve. From the intersection project horizontally to the right and read 0.55 g.p.m. per brake-horsepower-hour. Since there is a total of 3,000 hp. installed:

$$\text{g.p.m.} = 3{,}000\ (0.55) = 1{,}650$$

Auxiliary engines for driving station generating equipment will require additional cooling water but the quantity would be determined in a similar manner.

Lubricating-oil coolers.—Many large gas-compressor stations are now fitted with a separate cooling system for the lubricating oil. Although desirable, this arrangement is not absolutely necessary for satisfactory operation. Some stations operate quite satisfactorily with a common cooling system for both jackets and lubricating oil. In this arrangement the lubricating-oil cooler is placed between the heat exchanger and engine jackets. Cool water leaving the exchanger first passes through the lube-oil cooler where it absorbs heat from the oil and then goes to the jackets. Such an arrangement insures that the lube-oil temperature will be lower than the jacket-water temperature at all times. A difference of about 20° F. between the maximum jacket-water temperature and maximum oil temperature is usually considered desirable. Thus, if the jacket water leaves the engine at 150° F., the hot oil entering the oil cooler should be at 130° F. By providing an oil cooler with sufficient capacity to maintain this temperature differential, piston seizures will be almost entirely eliminated.

Piston cooling.—Either water or oil can be used for piston cooling but oil is generally preferred because there is no danger of contamination. Special arrangements for cooling piston oil are unnecessary because it is returned to the engine sump and is pumped from there to the oil cooler. The 20° F. difference between oil and jacket-water temperature mentioned above is necessary to prevent expansion of the pistons to the point where seizure would occur. If the oil temperature exceeded the jacket-water temperature, unequal expansion of piston and liner would result in insufficient clearance for piston operation.

Cooling-Water Piping

Steel, wrought iron, or brass piping can be used for conveying cooling water to and from the engine, heat exchanger, and cooling pond. In general, steel and wrought iron are preferred materials.

Proper velocities for jacket cooling water have been variously stated as anywhere between 3 and 15 ft. per second. Generally, the lower velocities (3 to 4 ft. per second), seem best suited for open cooling systems. With a closed cooling system, water velocities can be increased somewhat but values as high as 15 ft. per second should be used with caution and only when special conditions make them necessary. Whenever in doubt about the exact velocity to be used, it is well to consult the manufacturer because the design of the jackets may be such that high velocities at jacket entrance would cause imperfect cooling.

Piping Arrangement

It is in the choice of pipe routes, supports, and general arrangement that the gas-compressor-station designer's ability most frequently does or does not show up. Choice of the proper route can, in itself, save sizable sums in piping costs. For the usual station, that arrangement which concentrates all cooling equipment in one area is usually most economical from the standpoint of first, operating, and maintenance costs. Thus, when cooling tower or pond, surge tank, circulating pumps, oil coolers, and water-treating equipment are located close to the units served, all piping runs will be short. Besides reduced material costs, pumping losses are less and auxiliary power costs are reduced. Operation and maintenance are also simplified if proper clearances are left around all units.

Piping supports which permit upward slope between the circulating pump and engine, Fig. 1, are necessary to prevent accumulation of air in the piping or engine jackets. Between the engine and cooling pond or surge tank, according to the cooling system used, the cooling-water piping should pitch upwards or away from the engine. When physical obstructions such as beams, tanks, or other equipment prevent the desired pitch, the line can be sloped as necessary provided that a self-acting air relief valve is installed in the highest point of the pipe. In a closed cooling system the discharge pipe from the engine jacket should enter the bottom of the surge tank or the side, well below the normal water level. Since it is common practice to vent the surge tank, Fig. 1, cooling water which entered above the waterline would be exposed to unnecessary splashing and mixing with air. Hence, bottom or side inlets are most desirable.

Compressor Cooling

The minimum quantity of water for compressor cooling is generally stated by the manufacturer in the

unit's specifications. This quantity should never be reduced because overheating and excessive wear of the compressor cylinder liners are likely to result. Water for compressor cooling can be taken from that supplied the engine or from a separate system. In general, all of the above remarks concerning engine cooling are applicable to compressors, provided the essential differences between the two types of cylinders are recognized.

Besides the compressor cylinder jacket, the inter and aftercoolers, if used, must be supplied with cooling water. The amount required depends on the temperature of the gas entering the cooler, specific heat of the gas, outlet-gas temperature desired, and the heat transfer rate in the cooler. Since most inter and aftercoolers used in gas-compression work are of standard design or supplied by the compressor manufacturer, the calculations associated with them are simple and need not be discussed here. So long as the cooler has sufficient capacity to handle the maximum quantity of gas discharged by the compressor, little trouble will be experienced in its application.

Niagaran Reefs In Illinois

(Continued from page 49)

reef-bearing belt indicated in Fig. 3, as they cannot be applied when the interreef sediments as a whole become relatively pure and the red Moccasin Springs formation becomes patchy toward its feather edge.

Structural highs occur in the beds that overlie reefs, due to the thicker reef section and to the compactibility of the interreef sediments. These structural highs imperfectly reflect the reef topography and outline, and therefore bear only coincidental relation to the normal regional pattern of deformational structures. In general, alignment of reef structures may be more or less parallel to the reef front. Known structures in higher beds which do not fall into the regional structural framework should be reexamined for possible reef influence. In some instances there may be superposition of reef-controlled structures on deformational structures.

Structural Reflection

As reefs would not influence the structure of underlying beds, seismographic reflections from the "Trenton" will not indicate the presence of Niagaran reefs, although seismopraphic records of horizons above the Niagaran should prove useful. Gravity anomalies have proved successful in locating Permian reefs in west Texas, but it is not known whether there is sufficient difference in the density of reef and interreef Niagaran sediments to produce recognizable anomalies. The physical property of reef-rock which appears to offer the greatest possibility for direct geophysical detection in its electrical resistivity, which averages several times greater than that of the typical interreef sediments.

Fig. 3 indicates all known reefs in the area critical for oil production, although it is not complete for some areas in western Illinois. In addition it indicates a number of occurrences of reef flanks and reef-influenced interreef deposits in wells in the critical area. The most important of these near-reef occurrences can be summarized.

The Kingwood Oil Co. 1 Gaffner well in SW SE NE 30-6n-3w, Bond County, penetrated reef outwash containing fragments of reef-building corals and well-assorted crinoidal coquina. It therefore appears likely that the nearby gas-bearing Ayers structure is developed over a ridge-shaped Niagaran reef.

Three wells in northwestern Montgomery County, the Gulf 1 Brandon well, 1-10n-5w, the Central Pipe Line 1 Gees well, 35-11n-5w, and the Texas 1 Long well, 27-11n-5w, are all within the inner zone of reef influence as indicated by the fact that the Moccasin Springs formation has been replaced by reef outwash and unusually pure low-clastic dolomite and dolomitic limestone. Of the three wells, the Gulf 1 Brandon appears to be closest to the reef because it has a thin St. Clair section and contains the greatest amount of reef outwash. The presence of this postulated reef is strengthened by the occurrence of 50 ft. of normal Moccasin Springs strata in the Alan 1 Ward well in 23-12n-5w, 8 to 9 miles from the other wells and in the direction in which the Moccasin Springs formation is regionally disappearing. This last well is in the outer zone of influence in which clay-sized and reef outwash are dumped in the lee of the reef.

The Continental Oil Co. 1 Beachy well, 13-15n-6e, Moultrie County, penetrated 160 ft. of reef core and reef outwash and an additional 20 ft. of reef-influenced sediments beneath the reef material. This would indicate that the reef began its growth not at the location of the Beachy well, but at some other point nearby. This reef is indicated on the regional reef distribution map of the second Marine pool report.

The Carter 6 Brauer well, 21-8n-3e, the deep test in the northern part of Louden pool, penetrated interfingering reef outwash and core rock as well as interreef sediments.

The Pray 1 Baker well, 17-18n-6e, Piatt County, penetrated a section of reef core, with outwash above and below. Numerous wells in the La-Salle anticlinal belt from Coles County north penetrated reef core, outwash, or both.

The map showing reef distribution indicates other occurrences in which the evidence of reef proximity is doubtful, consisting only of unusually pure limestone or dolomite, whose relative purity may be due to admixture of reef-derived carbonates, or may indicate only normal sedimentary variations.

Possibilities for oil production from Silurian rocks other than the Niagaran reefs may be summarized briefly. Reservoirs of low permeability and consequent light oil or gas production may be developed in a number of Niagaran and Alexandrian rocks by post-Niagaran erosion and weathering. Suitable structural or stratigraphic trap conditions have localized pools within the belt where pre-New Albany erosion has laid bare the Silurian rocks. Oil production at Mount Auburn in Christian County, Collinsville in Madison County, oil shows in the Silurian or Sangamon and Morgan counties, and gas production at Pittsfield, Pike County, are of this type. It is to be expected that similar light production will be found in the future in the region of west-central Illinois in which the Niagaran is less than 250 to 300 ft. thick.

New Production Methods And Equipment

(Continued from page 56)

tubing and is a single hydraulic system.

At the left of Fig. 3 is a piston with the line. The next drawing indicates a flexible or telescoping shaft which supports the piston with a line in the center. The third drawing shows the piston inside its case with the hydraulic fluid acting and in its full extended position. The drawing on the right shows the piston up to the top, which would be with the load all the way to the bottom. The downward travel of the block can be accelerated by injecting air below the piston. This new rig should afford uniform hoisting, eliminating wire-line travel, and be useful where it is difficult to move in heavy equipment. The manufacturer now has a double-line two-piston unit on shop trial.

Purger Choke

Certainly there is nothing new about the purger choke (see Fig. 4). There have been well purgers of many designs for many years. However, there has been recent experience using a simplified purger choke of this type to reduce gas-oil ratios. Wells with high gas-oil ratios will waste a lot of gas by being produced on large enough chokes to keep the well from dying. If some wells are pinched back, to reduce or retard

some of the gas, they will load up and die. Hence, the switcher is either calling out the swab units, blowing too much gas to the air, or continually stopcocking the well.

To overcome this, the purger choke has been tried in several wells with considerable success. The fluid and gas travel in the path shown in the drawing, as long as there are large volumes of fluid and low pressures exerted on the well head.

The choke shown here merely goes inside of a regular positive-choke nipple and replaces the common positive choke normally used. It has an insert, that is drilled to predetermined choke size, which can be seen immediately below the path of the gas. That insert is free to move in and out of the whole choke assembly by means of a spring. The spring is set to predetermined loads and when the pressure decreases to a certain point it opens the path, which is shown, letting more fluid pass through the well. As pressure builds up, common to the purger chockes, the insert snaps closed, thus restricting the flow to that of the inside path.

The purger choke is very simple on wells where applicable. One case which might be quoted is a well which was gaged every month for the period of 1 year. The gas-oil ratio was between 17,000 and 20,000 to 1, and was producing 8 bbl. oil daily. The first day after installing the purger choke the ratio dropped to 6,000 to 1; the third day it was 3,000 to 1. After 1 month, and with further manipulation of the spring setting, the ratio was 1,000 to 1 and the well was producing 15 bbl. daily. It is difficult to determine the reason for this beneficial action. Possibly the coning of the gas has been stopped and is keeping the well bore in more uniform pressure. Possibly by maintaining fluid column opposite the sand section in a low-fluid-level well, the relative permeability of the sand section is increased.

Heat Exchanger for Positive Choke

Fig. 5 represents a simple shop-made apparatus devised by field personnel. Considerable trouble has been experienced in cooler climates with gas-lift lines freezing up. To solve this, a piece of casing was swaged in to make a water jacket. The wells which are on gas lift, and making a lot of water, flow through the outside jacket and heat the gas that is coming in.

Fig. 6 represents another basically old idea, but a new model is now being made. This is a bottom-hole choke and gas separator for pumping wells. The bottom-hole choke is adaptable to low-fluid-level wells, to prevent the surging caused by pumping and possibly stop some of the sand. The separation of the gas is not new; however, the combination of the two is new and has been very effective.

The bottom-hole choke on the inside makes the flow uniform as the pump above operates. And then the fluid which the pump brings in passes through the small outlet on the right and exhausts at the top with the gas going up the casing. The oil is dumped to the bottom and in turn picked up through the tube on the left. Then, as relatively dead oil, it is brought to the surface, thus eliminating gas locking, etc.

The new aspect of this equipment is that there is now on trial basis a unit with everything inside the tubing. The objection in the past has been the small pipes on the outside of the tubing. These are often damaged when going into the hole. Now with that all enclosed in the tubing, it should be easily run and more serviceable to the industry.

There are many items that could be considered new and certainly many improvements to old equipment and operating practices. The oil-industry personnel will continue to find new equipment and methods as long as oil is produced on a competitive basis.

Modern Fire Control

(Continued from page 61)

trol. Let me emphasize the word control. Modern practice in oil fires divides sharply between the control of running fires and those in open vessels. Fires in atmospheric storage tanks from which the roofs have been blown are still put out with foam and nothing has taken its place, in spite of all that has been done with other fire-control devices. Modern air foam is a far cry from the old chemical-foam systems that we built at such great cost 30 years ago, but it is still foam. There is nothing better where you have to deal with a great area of burning liquid surface.

In the gas plants, however, fire extinguishment is wholly a secondary matter. The important job that must first be done is to neutralize the heat of the fire so that it will not cause pipes and vessels in the neighborhood to weaken, or their contents to expand and cause hydraulic failures. Only water can do this because only water is cheap and plentiful enough to soak up the tremendous heat of a gas flame. It is well to remember that regardless of whether it is liquid or vapor that is being spilled, the flame will continue so long as there is fuel to supply it. Heat control must continue that long.

Modern technology of fire control is built around the use of water fog as a cooling agent. The history of this technique is of especial interest because the original work in the development of water fog was done at the Vernon refinery of General Petroleum Corp. more than 25 years ago by Ben Moeller. He was looking for a means of getting foam onto the surface of a burning oil tank without submerging it in the oil.

One of the devices Moeller tried was a nozzle in which he impinged two streams of foam solutions against each other at high velocity. Thus he made a foam fog that fell like sloppy snow onto the surface of the burning tank. It worked perfectly when tested on a tank that wasn't on fire but it wasn't worth a second try on a burning tank because the upsweep of the flames wouldn't let the foam fog reach the surface. So Ben laid away the fog nozzle and went into the development of a porous asbestos sock. That sock, by the way, is now known as the Moeller foam applicator.

The fog idea was dead so far as foam went, but it was picked up and exploited by a clever fire chief in the Los Angeles County Fire Department as a means of creating a cooling shield of fog that would permit men to approach the source of a fire. Captain Griswold demonstrated the value of water fog in fire after fire in his Santa Fe Springs district and before long it became the recognized means of attacking any type of fire other than those in tanks.

Even city fire departments have adopted water fog wherever they can get within striking distance of a fire with the relatively short throw of a fog stream. For gas fires, it is the only means whereby heat can be absorbed so that control of sources of fuel can be put into effect.

Gas fires must be starved. That is, they must be extinguished by cutting off the supply of fuel. The problem lies in shutting off the supply. The hazard lies in the effect of the heat on surrounding structures while the control measures are being worked out. The great value of the modern fog technique is that it protects both men and exposed equipment from the heat of the fire.

A midwestern plant, several years ago, installed a system whereby all bare L.P. vessels were protected by fixed water sprays. When a corroded line blew out and released a considerable volume of liquid gas (butane and heavier) it flashed from a nearby fire box. Water was turned on from remote control valves, about 100 ft. away. The fire burned for about 3 hours but the coarse sprays gave adequate protection for the large lines, pumps, stanchions, etc. Small lines and electric conduit suffered damage. The tanks (about 10 by 25-ft. horizontals) had no damage and even the paint was intact.

Words alone cannot fully describe this modern approach to the fire problem; it must be seen to be appreciated and it must be taught in fire schools.

Summary

Plant design must take into account the extreme potentiality of loss if large releases of liquid or vapor occur; hence design must be overconservative.

Maintenance and inspection must

be provided for in the design, so that they will not be neglected in the field because units cannot be taken out of service without complete plant shutdown.

Operating mistakes must be anticipated. That is a penalty of having to deal with human beings. But insofar as possible, mistakes of judgment on the part of operators must be guarded against by anticipating what could happen, and working additional safeguards into the design. Instruction is fine but training in actually doing the right thing in a simulated disaster drill is a lot better. That goes for fire-control training in the use of water fog, gas-borne fire-fighting powders, etc.

Every plant operator should be shown fire-training pictures to let him see the limits of the various techniques and if possible, plant operators should regularly have fire-pit training in which they actually handle the equipment.

BOOKS

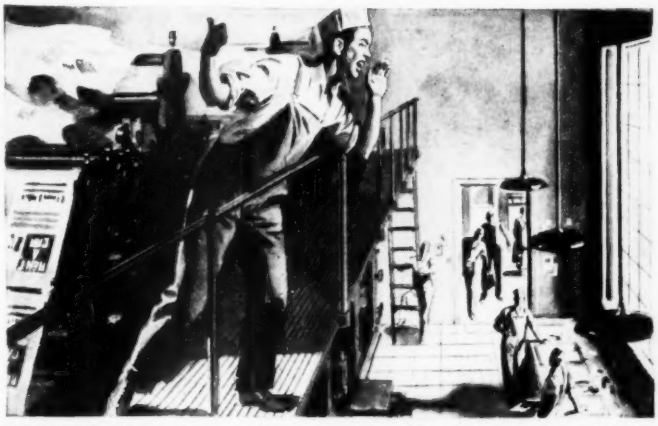
A SYMPOSIUM ON SUBSURFACE LOGGING TECHNIQUES. Edited by Carl A. Moore. Published by University Book Exchange, Norman, Okla. 113 pp. $1.95

On April 5 and 6, 1949, the University of Oklahoma's school of geology, in cooperation with the department of short courses, extension division, sponsored a symposium on subsurface geology on the campus. An outstanding group of men, representing several service companies, consulting geologists, and engineers, presented papers dealing with many aspects of subsurface-logging techniques, which papers are reproduced in this plastic-ring-bound mimeographed booklet. The 11 papers presented cover such subjects as factors involved in practical electric-log analysis; radioactivity well-logging applications in oil-well completions; sampling and examination of well cuttings; the geolograph mechanical well log; interpretation and use of drill-stem testing and bottom-hole pressures; technique and application of dipmeter and photoinclinometer surveys; methods and applications of mud-analysis and cuttings- analysis well logging; geochemical well logging; caliper and temperature logging; relative permeabilities, and drill-stem-testing procedure in open hole.

DEVELOPMENT OF AIRCRAFT ENGINES. By Robert Schlaifer, and DEVELOPMENT OF AVIATION FUELS. By S. D. Heron. Published by Division of Research, Harvard Business School, Boston. 63 + 754 pp. $5.75.

This volume comprises two studies of relations between Government and industry. Both are focused primarily on the question: "How can Government and industry work together to keep our technical research and development up to, or ahead of, that in other countries?" The authors answer this question with specific recommendations based on their careful analysis of numerous development projects since World War I. Experience in the United States, Great Britain, and Germany was examined in detail, and evidence is presented to allow the reader to judge the results for himself. Among the patterns of joint development by Government and industry of aviation engines and fuels, the authors consider: private enterprise using its own resources, industry financed by public funds, original research by Government, and cooperative activity among the engine and oil industries and government units, particularly the armed services.

Press breaks down — but $2.88 keeps editions rolling



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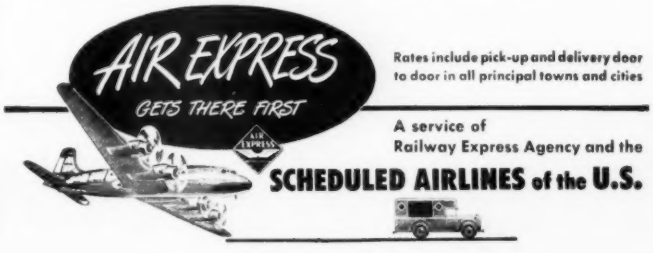

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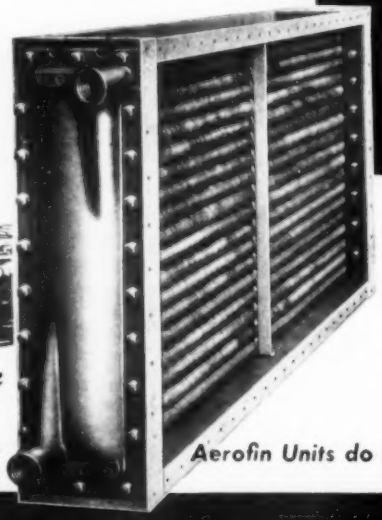

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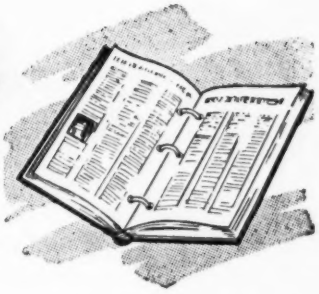
The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL



Automatic Control

INSTRUMENTS are applied to refinery processes in the interest of obtaining greater throughputs and keeping product on specification. To accomplish this the process variables are ordinarily measured and controlled. Those most commonly dealt with in the refinery are temperature, flow pressure, and level. Automatic control consists of maintaining a balance in a process through the use of (1) a primary measuring element to "sense" or measure a change which takes place away from the balance or control point, and (2) a final control element which creates a counteraction to such a deviation.

Between primary measurement and final control a means of amplifying, transmitting, or translating a change in the controlled variable is provided. In terms of controller equipment this part of the control system is available in a great variety of forms. It may be incorporated directly with the final control element to constitute a self-acting controller or mounted remotely on a centralized panel board.

Controlled Process

Fig. 1 illustrates in a general way a controlled process. Using the terminology of the I.I.R.D. committee of the A.S.M.E. the controlled medium is the process energy, material, or fluid stream for which a variable in controlled. The control agent is that material or fluid stream in which a condition or quantity is varied to provide a counteraction and constitutes the manipulated variable.

The analysis of a controlled system may be made more concrete by considering the process of heating fractionator bottoms in a reboiler. The controlled medium in this case is the vapor returning from the reboiler to the column and the controlled variable is its temperature. The primary measuring element is either a bulb-capillary thermometer or thermocouple. Also included are a pneumatic transmitter and final control element in the form of a motor diaphragm valve. The latter operates on the control agent (steam to reboiler heater tubes) to change the manipulated variable which in this case is the rate of flow of steam. A change in temperature of reboiler vapor from the set or control point is measured by the primary element resulting, through action of controller and final control element, in a corrective change in the amount of steam admitted to the reboiler heater. In practice with such a system the actual controlled variable would be the column temperature.

Lag in Controlled Systems

To be sure that instrumentation will be applied correctly to a given process, the system to be controlled requires analysis in terms of lag. The "lag" of the system in turn depends on system capacitance, resistance, and dead time. Complete balance in a controlled system is seldom obtained or maintained as such. Reference is made to a set or control "point," but control is actually obtained within wider or narrower limits or as an average between maximum and minimum points defining the limits. The primary measuring element does not pick up instantly a change in the temperature of reboiler vapor. Additional lag exists in transmission to the controller and in setting the motor valve to change steam input. While this is happening the vapor temperature has deviated for a given period of time from the set point. Throughout this sequence of events the time element has to be considered. Thus not only is the magnitude or amount of the change in vapor temperature important but also the rate of change or the amount the temperature changes in a given time.

Process Lag

The process itself, as well as the instrument, is subject to lag. As the motor valve opens to admit more steam into the heater tubes corresponding to a drop in the temperature of reboiler vapor, the heat brought in by the steam must overcome thermal resistances in transferring to the liquid bottoms. The rate of transfer depends on the temperature differential between the transfer fluids, resistances offered by steam and hydrocarbon films, thermal conductivity of heater-tube metal, degree of fouling of heater tubes, and the heat-transfer area presented by the tubes relative to the amount of liquid being vaporized.

Storage capacity of the system refers to the number of B.t.u.'s picked up by the reboiler from a given amount of steam entering in unit time. Capacitance would then be expressed as this number of B.t.u.'s relative to the rise in vapor temperature in the same unit time. In a heated vessel containing a large volume of liquid, storage capacity for heat is high in the sense that any external changes such as variation in steam pressure or change in rate of flow of liquid into the vessel would not affect the temperature to a serious extent. If, however, the unit under consideration were a heat exchanger with liquid through tubes at high velocity, and hence small volume of liquid in the system at any one time, external changes would reflect to a much greater extent on the primary measuring element.

In the first case the system exhibits a stabilizing influence by virtue of large lag due to the mass of liquid in the vessel. In the high-velocity heat exchanger lag is small but susceptibility to upsets due to external changes has been increased. In summary, capacitance, resistance, and dead time singly or in combination are involved in determining the lag in a controlled system.

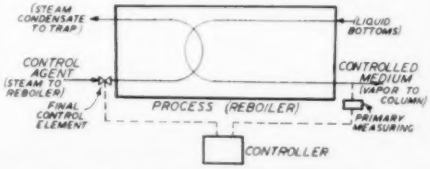


Fig. 1—Principle of automatic control illustrated schematically for a reboiler.

No. 9 in current series. The Refiner's Notebook has been published continuously since 1944.

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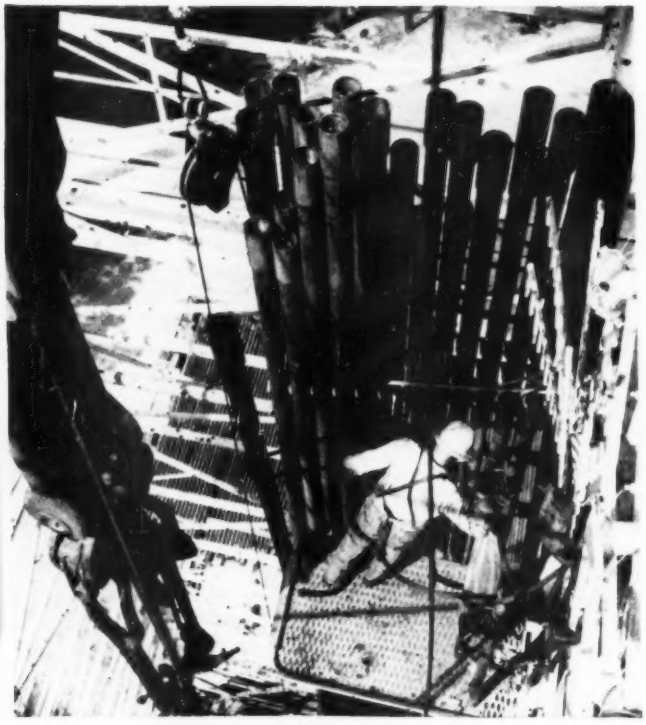

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QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Asphalt Manufacture

Can you tell us or direct us to complete information on the production of roofing asphalt, especially with regard to the following details:

1. Construction of the blowing still.

2. Quantity of air required per minute per ton of oil being blown.

3. What are the hazards of the operation and what precautions are advisable?

4. Can the gas and oil vapors from the still be collected and if so, by what means?—J.R.M.

Asphalt manufacture varies so widely because of variations in the types of charge stocks employed, types of products desired, and various equipments that have been at hand when a plant was built, that no short description is possible. Probably each specific operation will of necessity involve modifications that are unique to the particular situation. Thus, each operator must, to a large extent, develop his own process. Accordingly, a list of references is given at the end of this discussion — references that pertain primarily to manufacturing operations rather than the properties or behavior of asphaltic materials.

The content of the many references has not been explored, but in general, they pertain at least to the following topics:

Fume disposal—References 3, 7, 9, 13, 14, 16 (March and May), 18, 24, and 28.

Blowing and Air—References 1, 16 (May and April) 17, 23, and 32.

Emulsions — References 11, 19, 20, 25, 29, and 31.

Plants and Operation — References 2, 4, 5, 10, 16 (many), 16 (operation July and August), 18, 23, 25, 26, 27, and 30.

Still Detail — References 16 (April, May, September, and October), 17, and 21.

Packaging, Loading, and Storage—References 10, 16 (April and November), and 18.

Vacuum Distillation—References 6, 8, 12, 15, 16 (June), 18, 22, and 33.

The most useful references are discussed briefly hereafter. Abraham's book (1) is the standard classic on asphaltic materials. The W. B. Hart series (13) is authoritative and extensive with respect to waste disposal. Holland's articles (16) are now somewhat old but they still give more plant construction and operational detail than any other references. Article 18 by Kastens describes modern asphalt processing. A digest of fume-disposal literature is given by Nelson (24). Thurston and Knowles (32) indicate the compositions of gases derived in asphalt blowing.

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Compression Process Is Obsolete

Can you furnish me with references on the compression process for natural gasoline manufacture?—W.E.G.

Inasmuch as the compression process has been obsolete for about 20 years, the question will not be answered, except to emphasize the purely secondary position of compression today. References to older literature such as Cross, "Handbook of Petroleum, Asphalt and Natural Gas," (1926); Leslie, "Motor Fuels," Chemical Catalogue Co. (now Reinhold Publishing Co.), 1923; and Day, "Handbook of the Petroleum Industry," John Wiley & Sons, Inc., (1922), all indicate that the use of the absorption process of natural-gasoline extraction was during 1920-1925 already on the ascendency. A few compression plants operate even today, but in some situation that requires only the most simple type of equipment.

The reader should not be confused by the use of compressors or compression in connections with other processes, even the absorption process. A high pressure is useful in decreasing the amount of absorption oil used in the absorption process. The old compression process consists of compression followed by a cooler. The condensate is collected in a receiver. There is nothing unique about the compression of natural gas except that the gas heats up less (than air) when it is compressed. The amount of heating that occurs is dependent upon the ratio of specific heats (constant pressure to constant volume). The ratios for various gases are given on page 175 of the third edition of "Petroleum Refinery Engineering," (McGraw-Hill Book Co., Inc., New York, 1949).

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SPECIFY GOODALL FLEX-CORD — When you buy your . . . remember the story of Goodall's superior, . . . Flex-Cord Rotary Hose. Remember, too, Goodall's . . . Barney Couplings save your hose from the . . . hazard. Remember that Goodall has been first with . . . worthwhile rotary hose development. And above all, . . . remember that you can't buy better rotary hose for any . . . amount of money.

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OIL AND GAS EQUIPMENT *Digest*

IT'S NEW — CHECK IT

TRADE LITERATURE

1 WORTHINGTON CENTRIFUGAL CHEMICAL PUMPS. This bulletin describes and illustrates some of Worthington's centrifugal pumping equipment used in process industries. It gives a complete explanation of the mechanical seal specially designed to prevent leakage of corrosive liquids. *Worthington Pump & Machinery Corp.*

2 SILICONE COATING ALUMINUM describes protective coatings for weather-exposed service at temperatures to 750° F. This new product utilizes to the fullest extent the unique characteristics of silicon resins. These semiorganic materials combine high inertness and heat stability with unusually high water repellency and low moisture absorption. *Dampney Co. of America.*

3 Z-CRETE UNDERGROUND PIPE INSULATION. A new eight-page folder describes Z-Crete, a lightweight resilient concrete used for the insulation of heated piping installed underground. The method of insulating underground hot lines with a continuous system of insulating concrete is fully described and illustrated. *Zonolite Co.*

4 STANDARDAIRE BLOWER. Publication 86, is a handy selection chart which lists the various capacities possible in the Standard blower when direct connected to standard-speed motors. *Standard Stoker Co., Inc.*

5 GRAVIMETRIC SURVEY AND REPORT is a condensed replica of a county gravity-meter survey, in miniature form. Reproductions of maps, overlays, analyses, and a detailed explanation of the data are included to show how producing areas are located by the modern gravimeter method. *Exploration Surveys, Inc.*

6 DIESEL-DRIVEN ELECTRIC PLANTS is a four-page, two-color bulletin describing the company's entire line of diesel-driven electric-generating plants. Models range from single-cylinder, 2,500-watt, air-cooled units to massive 6-cylinder, 60,000-watt, water-cooled plants powered by International Harvester diesel engines. *D. W. Onan & Sons, Inc.*

7 FROM GUESSOMATIC TO AUTOMATIC. A new 16-page bulletin on Flex-O-Timer time-cycle controllers features an instrument which is particularly adaptable to those applications which have a multiplicity of functions to perform during the course of a cycle. *Taylor Instrument Cos.*

8 PERFORMANCE COUNTS. This 40-page catalog is devoted to LVD and SAC Flex-A-Power, the heavy-duty members of the power-distribution family which are used as main feeders. It describes construction details, accessories, engineering data, and application information. *Trumbull Electric Mfg. Co.*

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9 THE NEW DIESEL ENGINE-TORQUE CONVERTER UNIT. In the pages of this 24-page, multicolor, illustrated booklet is complete information concerning what a torque converter is and how it functions, where and how it has been applied, and an invitation to power-machinery users to use manufacturer's facilities in engineering particular applications in any field. *Detroit Diesel Engine Division, General Motors Corp.*

10 CYCOIL is a new manual covering new designs and improvements in Cycoil Oil-Bath air and gas cleaners. New sizes have been added to the WO1 air cleaner series and a new design (WO3) has been introduced. *American Air Filter Co., Inc.*

11 GARY GRATING AND TREADS. Applications of each design of grating are well illustrated in this 18-page, heavily bound brochure. Safe load and specification tables on both welded and riveted gratings are included. *Standard Steel Spring Co.*

12 SHEELD describes a permanent anticorrosion compound that with one thorough application, will neutralize existing corrosion on terminals, cable ends, carriers, and hold-downs, and permanently shield these parts against future corrosion for the life of the battery. *Sterling Industries, Inc.*

13 OIL-FIELD ENGINES is a four-page specification sheet on the eight-cylinder, oil-field engine model 8-PC-2505, designed to operate on natural gas or butane, and rated at from 212 b.hp. at 600 to 1,750 b.hp. at 1,200 r.p.m. The folder includes description of all component parts of the model. *Buda Co.*

14 CRANK COUNTERWEIGHTED PUMPING UNITS describes the D-9, D-11, D-13, and D-15 pumps with type B cranks for medium to heavy loads. A.P.I. beam load ratings are: D-9, 8,900 lb.; D-11, 11,000 lb.; D-13, 12,750 lb.; and D-15, 15,000 lb. Features of main base, sampson post, walking beam, beam hanger, and pitman assembly are well illustrated. *National Supply Co.*

15 CATALOG 20 is an eight-page brochure describing a right-angle, solid-shaft gear drive for centrifugal pumps and industrial use. Features of the drive are illustrated in both a cutaway section and engineer's drawings. Complete dimension and selection tables are included. *Johnson Gear & Manufacturing Co., Ltd.*

16 LIFT, PULL, LOWER features hand hoists in 2, 5, and 15-ton capacities. The 2-ton hoist is available in two drum sizes, 6 and 10 in.; and the 5-ton hoist is available in 8, 12, 16, and 24-in. drums. *Beebe Bros.*

17 SNO-CATS describes the features of this track-mounted vehicle capable of hauling men, materials, and equipment in deep snow and over rough terrain, making it particularly valuable in field maintenance work. *Tucker Sno-Cat Corp.*

18 SUPRAMOR GALACTOL E. P. is a data sheet on a new soluble cutting oil for use when machining nickel-chrome and other exceptionally tough alloy steels. *Manchester Oil Refinery (Sales), Ltd.*

19 TEMPIL PREHEATING CHART is a data sheet covering metal groups and designations, approximate composition, recommended preheat, and recommended tempils or tempilstiks for indicating temperatures. *Tempil Corp.*

20 CONSERVATION VENT VALVES AND UNITS. Fully illustrated, this eight-page booklet presents all pertinent information on a series of venting units that offer greatest possible protection for venting inflammable liquid storage at low cost per 1,000 cu. ft. of venting capacity. *Vapor Recovery Systems Co.*

21 STEERING-WHEEL TYPE 2S TUBING HEAD introduces a tubing head designed to withstand 4,000-psi. test pressure or 2,000-psi. cold working pressure, which can be used for pumping production, for flowing wells, for acidizing, or for repressuring projects. *Don R. Hinderliter Co.*

22 A STORY OF SOUND is a bound article by Robert R. Buntaine dealing with sound, sound measurement, and noise control. The article is written in laymen's language so that it will be useful to those not familiar with scientific terms. *Burgess-Manning Co.*

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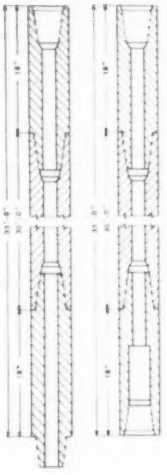
IT'S NEW CHECK IT

by Dan B. Miller

23 REPLACEABLE END DRILL COLLARS. A new type of drill collar with replaceable ends, designed to minimize the problem of joint failures, has wear subs more or less permanently affixed at both ends. The new drill-collar assembly consists of a double-box collar body equipped with a box and pin sub on the upper end and a double-pin sub on the lower end. If a collar is used continuously at the bottom of the string both ends have box and pin subs and the bit shank can be connected directly to the lower end. The sub can be lengthened enough to be counter bored for a float valve recess, if necessary. If a taper joint failure occurs, or the outside diameter has been reduced enough to warrant replacement, any replaceable end can be removed and replaced with a spare end, without special equipment. *National Supply Co.*



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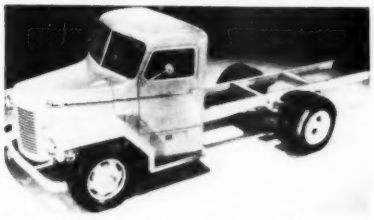
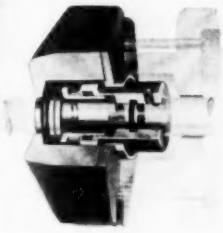
24 MODEL LD FOUR-WHEEL-DRIVE TRUCK has a gross vehicle weight of 14,500 lb. While the new



Model LD will have its place in off-the-highway service, it also has high efficiency on the road. Applications are for maintenance, oil-field operations, general construction, and telephone and electric-line construction. *Four Wheel Drive Auto Co.*

IT'S NEW CHECK IT

25 REPSCO is a mechanical rotary shaft seal designed to overcome problem of fluid leakage on centrifugal or rotary shafts. This seal offers the following advantages: it is fabricated to fit any pump without costly alterations; it can be installed easily by mechanics or maintenance men; it compensates for both end thrust and misalignment in pump; it is hydraulically actuated and balanced by fluid pressure within the pump; it affords protection from abrasives or foreign particles; and fire hazards and dangerous working conditions are nonexistent as floors stay dry and clean. *Republic Supply Co.*



IT'S NEW CHECK IT

26 PE, a new product to prevent well corrosion and control scale deposition. The single solution is a mobile liquid composed of extremely effective inhibitors, agents that lend stability to the chemical compounds existing in the well fluids, plus one or more surface active agents selectively employed for specific conditions. PE is made up to a prescription based upon analyses of the well fluids—oil, gas, and water and pertinent information for each area and depth, and in some cases, each well. The inhibitors used in the PE are dispersed in the well fluids and travel upward in the tubing. They enter into the ionization as soon as a galvanic cell forms, and plate out one or both terminals, nullifying the galvanic action. Moreover, these inhibitors retain their effectiveness at temperatures above 200° F. PE also tends to hold in chemical equilibrium the supersaturated compounds in the well fluids. In order to remove any oil film that may isolate the steel from the action of PE, a surface-tension depressant and a detergent are added. These agents scavenge the steel surface of oil and place it in direct contact with the rectifying materials. In order to destroy water and oil emulsions that may be detrimental to the efficiency of the various actions of the PE, a demulsification agent is added. *Texas Acidizers, Inc.*

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The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

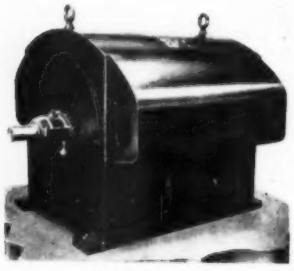
27 THREAD PROTECTORS. Two types of thread protectors for facilitating safety and easy handling of drill collars and subs are made $\frac{1}{2}$ in. larger in diameter than the joint for which they are furnished. This means that all wear and damage in handling are taken by the protector, not the joint. Made of cast steel, they are carefully machined to establish specifications and will make up and shoulder like any standard tool joint. The lifting eye is cast integrally with the body of the protector and provides ample room for winch line or cat line. All threads are cut extra long to accommodate extra-long joints on collars or subs. *S & R Tool & Supply Co.*

IT'S NEW CHECK IT

28 CARMAN OIL-WELL CASING GAGE. Made of brass and stainless steel, this compact oil-well casing gage is easy to use and can be read at a glance. Ends are especially hardened for durability. It measures sizes and gages weight of casing per foot, in sizes from $5\frac{1}{2}$ through $13\frac{3}{8}$ in. outside diameter. It also measures sizes of threads 8, 10, and $11\frac{1}{2}$ per inch. *Green Pipe & Supply Co.*

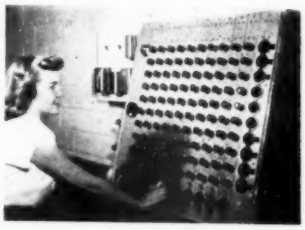
IT'S NEW CHECK IT

29 OUTDOOR SPLASHPROOF MOTOR. Built in sizes from 150 to 2,000 hp., 4 to 14 poles, this motor has a ventilating system with straight-through inlet and discharge openings on both ends of the motor that insures full protection from all directions against wind-driven rain. Foreign matter blown into the ventilating openings is deflected by a series of baffles and either drains out or travels straight through the exterior ventilating system and out the other side without entering the interior of the motor itself. Stator coils are vacuum pressure impregnated. An interesting feature from an economy standpoint is that the foundation for this new motor may be a simple, economical concrete slab. Either sealed, split, ring-oiled, sleeve, or anti-friction bearings are available. *Elliott Co.*



IT'S NEW CHECK IT

30 SPECTRO COMPUTER, an accurate, time-saving, electrical computer which solves simultaneous linear equations of the type encountered in infrared and mass spectrometry by a method of iteration. Multiplication, division, addition, and subtraction steps necessary in solving a spectroscope analysis problem involving as many as 10 simultaneous equations can normally be performed by the computer within 5 to 30 minutes. Results of spectroscopic analysis of hydrocarbon samples have been computed to an accuracy of 0.1 per cent with this instrument. *Phillips Petroleum Co.*

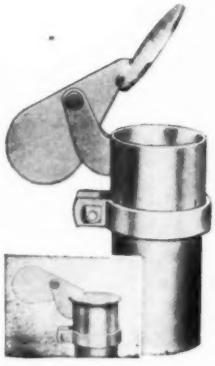


IT'S NEW CHECK IT

31 PRINCIPLES AND PRACTICE OF FLOW-METER ENGINEERING. A complete, up-to-date, and authoritative treatise on all phases of flow engineering, giving all the necessary information for calculating an orifice, flow nozzle, Venturi tube, Pitot tube, or even a pipe elbow used for flow measurement. The common pressure tap locations are discussed, and data given to correct for odd tap locations. Liquids, steam or other vapors, and gas, are handled in separate sections. Instructions, curves, and tables are presented in logical sequence, and viscosity corrections are furnished. Equations and curves for calculating throttling orifices to be used at critical pressure drops are a new addition to the book. *Foxboro Co.*

IT'S NEW CHECK IT

32 WEATHERCAP. This completely automatic exhaust pipe cover offers year-round protection for truck and tractor. Weathercap opens and closes instantly with the engine exhaust at any position to 30° from vertical. Heavy-duty construction includes a stainless-steel hinge in the bushing, bolt of 41-40 cadmium-plated steel, and an aircraft-type split locking nut to take up play due to wear. Features rugged construction over-all, yet is light in weight. This exhaust pipe cover has been fully field tested. *C. R. Taylor & Co.*



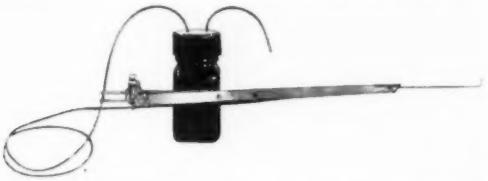
IT'S NEW CHECK IT

33 VINYL-COTE, a new coating, is an impervious tank lining which does not blister or peel. Field tests show that it combats corrosion and withstands sour crude, salt water, alkalies, acids, and corrosive gases and fumes. Vinyl-Cote's properties are derived from the vinyl copolymer resins used in its production. They give it wide flexibility and amazing resistance to caustic, sour crude, and most acid solutions. The new coating also is almost totally unaffected by oils, greases, and petroleum solvents and stands up well against aromatic solvents. It is readily soluble in the ketone and ester

group of solvents and its resin films will withstand operating temperatures up to 180° F. *Glidden Co.*

IT'S NEW CHECK IT

34 NEVER-DRY RECORDING CHART PEN will write for several months without servicing. The pen makes



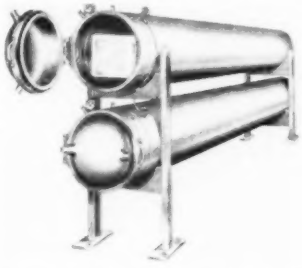
a clear, sharp record without smear. Working on the capillary principle and using a closed system, the new pen utilizes an ink reservoir in the form of a bottle. A small flexible tube leads from the bottle to the pen. Ink feeds to the pen at the same rate it is used and never blurrs. The clear glass bottle placed inside the instrument case tells visibly when the ink supply needs replenishing. Weight of the new pen is consistent and does not vary according to the ink supply, as do ordinary pens. Therefore, results are always consistent and accurate. *American Recording Chart Co.*

IT'S NEW CHECK IT

35 FIREPROOF COATING FOR METAL will resist 3 hours of intense heat. Particularly applicable to processing and drilling equipment, fireproof coating will prevent steel beams and similar equipment from warping and twisting when an accidental fire gets too big and hot. *Eagle-Picher Co.*

IT'S NEW CHECK IT

36 DRY ICE CONVERTERS offer convenient permanent CO_2 gas supply to industrial processes that need a substantial standing supply of CO_2 gas readily available. Full 50-lb. commercial blocks of dry ice may be charged into converter, eliminating constant and costly CO_2 gas cylinder reshipment. Full-opening converters are available in 300, 600, 750, and 1,000-lb. dry-ice capacities. The 1,000-lb. capacity converter stores approximately 8,700 cu. ft. of CO_2 gas which can be withdrawn at rates up to 850 to 900 cu. ft. per hour. Liquid CO_2 may also be withdrawn. Converters are built to A.S.M.E. code specifications. Special racks are available for vertical or horizontal mounting in accordance with space requirements. *Dry Ice Converter Corp.*

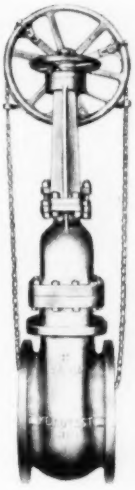


IT'S NEW CHECK IT

37 ASBESTOS PIPE-LINE FELTS for use in conjunction with coatings as an inorganic, nonrotting wrapping or shield are made by Gama Industries, Inc., to meet American Waterworks Association specifications. It is composed of pure asbestos fiber, felted into a basic, uniform, dry felt with minimum ingredients other than asbestos. Saturation is with either tar or asphalt, depending on the enamel with which it is to be used on the line. The saturants are to the specifications which have been found best to eliminate absorption of field coatings. *Middle West Coating & Supply Co.*

IT'S NEW CHECK IT

38 NEW 24-IN. SERIES 150, O S & Y GATE VALVE. The new valve is available in both solid-wedge and split-wedge design, and is equipped with all standard trims. Operation can be either hand wheel, motor, bevel gear with pinion wheel, of sprocket and chain on pinion wheel. *Kerotest Manufacturing Co.*

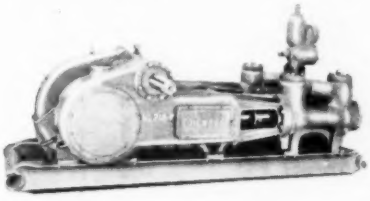


IT'S NEW CHECK IT

39 "HARD'N'TUFF," a new steel hardening compound, will impart to a mild 1020, or a tool-steel drill, a guaranteed increase of at least 300 per cent in tool life. The process adds certain ingredients which have both a nitriding and alloying effect. By fusing this chromium-rich compound into the steel, a hard outer surface is formed, which is highly impregnable and resistant to wear, corrosion, and high temperatures. The core, however, remains tough and flexible. Hard'N'Tuff is packed in 3, 5, and 10-lb. cans; 25, 50, and 100-lb. drums. *Doughty Laboratories, Inc.*

IT'S NEW CHECK IT

40 NEW 218-P POWER SLUSH PUMP. Weighing 31,000 lb., its 450 input horsepower at 60 r.p.m. gives a weight of less than 70 lb. per horsepower. In spite of its light weight, rigidity is assured by power frame



design, in which the one-piece frame entirely encloses working parts. Pump will discharge up to 735 g.p.m. with full-size liners and has a rated working pressure of 890 psi. with full-size liners. Maximum working pressure of fluid end is 3,000 psi. It has a one-piece direct-flow type, cast-steel fluid end with large streamline passages which assure minimum restriction to mud flow. Equipped throughout with heavy-duty roller bearings, power end is lubricated by a combination oil bath and positive-flow lubrication system. *Oil Well Supply Co.*

IT'S NEW CHECK IT

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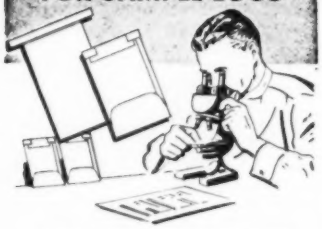

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REFINING

McCarthy Chemical Co. Closes Winnie Plant

HOUSTON. — McCarthy Chemical Co. has shut down its $15,000,000 plant at Winnie, Tex., 25 miles southwest of Beaumont, for an "indefinite period."

An announcement from company headquarters said that the shutdown is necessitated by process and equipment changes. In addition, increasing production costs were influential in the decision, the announcement stated.

The chemical plant has been in operation only a little over a year. Rumors have been current in Houston for some months that difficulty was being experienced by the unit. The plant produces formaldehyde, acetaldehyde, and methanol from residue gas by a direct oxidation process.

McCarthy Chemical Co. also operates two gasoline-absorption plants located on acreage adjacent to the plant. These units, which produce butane, propane, and natural gasoline, are to continue in full operation. Company officials said: "The full stream of natural gas and distillate will continue to be processed by the absorption units of the company." One of the absorption plants was put into operation only last summer. The other unit, with a capacity of 100,000 gal. daily, has been in operation since November 1945.

The shutdown plant was built as the result of studies made in 1946. Construction began in the summer of 1947. Formal opening of the plant was in the latter part of 1948.

In addition to residue gas from the absorption plants, raw materials for the plant include lime, sulfuric acid, and caustic. Oxygen, which is required on a tonnage scale, is manufactured at the plant site from air using a modified Linde-Frankl cycle low-temperature process.

Asphalt Institute Opens Office in Austin, Tex.

G. B. FINLEY

The Asphalt Institute has established an office in Austin, Tex., and has appointed George B. Finley, formerly of the Texas State Highway Department, as district engineer. He will aid in supervision activities in the southwestern division, including Texas, Oklahoma, and New Mexico. Hugh A. Wallace is supervisor of the division, having recently been appointed division engineer with headquarters in Dallas.

Finley, a graduate of University of Texas, will handle engineering, re-

NELSON REFINERY-CONSTRUCTION INDEX

Appears in the first issue of each month.
Explanation—Cost-imating No. 61, December 15, 1949, pages 91, 92.
Compiled by W. L. Nelson—Refinery Consultant—Tulsa.
Indexes of Individual Equipment Items—January, April, July, October.

INDEX (1946 = 100)

	1947	1948	Nov. 1949
Centrifugal pumps	109.0	120.0	119.0
Reciprocating pumps	130.1	143.1	144.6
Compressors	114.0	128.0	117.0
Engines	109.0	120.0	113.2
Motors	*122.0	*135.0	*130.0
Transformers	*122.0	*135.0	*130.0
Instruments	†113.0	†120.0	†123.1
Miscellaneous equipment average	*117.0	*128.7	*125.3
Materials component	123.0	140.5	142.5
Labor component	113.5	128.0	140.0
Refinery-construction index	117.1	132.8	141.0

*Subject to revision. †Revised estimate.

search, and promotional facilities of the institute to highway engineers. The office is located at 1109 West Tenth Street, Austin.

Expansion to Get Under Way Soon at Grangemouth

Actual construction on proposed expansion of Anglo-Iranian Oil Co.'s refinery at Grangemouth, Scotland, will get under way soon, with the first stage to be completed by the end of this year, and the second stage to be finished by mid-1952.

Economic Cooperation Administration approved construction of a new petroleum chemicals plant, to be built near the refinery, at a cost of $17,000,000 toward which it will grant $6,500,000 to cover engineering fees and services, and purchase of special equipment in the United States *(The Oil and Gas Journal, December 8, 1949, page 52)*.

In the first stage of refinery expansion, it is proposed to install a modern distillation unit, complete with stabilizing equipment, as well as facilities for treating the various fractions.

The new British Petroleum Chemicals, Ltd., plant nearby will manufacture chemicals from feed stock supplied by Anglo-Iranian's refinery. Included in the expansion is a new steam boiler and power plant, water system cooling, and compressed air equipment, and other facilities.

Now under development is the second stage of the expansion program. It will include a modern catalytic cracking unit and a vacuum distillation unit to prepare for catalytic cracking and a catalytic polymerization plant. Also a treating plant will be installed to handle products from the cracker, and distillation and treating capacity for special product manufacture. A new office and a laboratory will be erected to accommodate the administrative operating staffs.

Work Started on Expansion Of Canton, Ohio, Refinery

Field work has commenced on a revamping and expansion of the catalytic polymerization and light ends recovery units at the Canton, Ohio, refinery of Ashland Oil & Refining Co.

Two cases are being added to the poly unit, increasing its capacity to about 250 bbl. of product daily. The light ends unit, operated in conjunction with a 2,000-bbl. per day thermal cracking unit is being similarly expanded.

The 12,000-bbl. Canton refinery was purchased by Ashland in 1948, from the Canton Division, Central Pipe Line Co. of Canton.

September 5-9 Are Dates For Chemical Exposition

The sixth annual National Chemical Exposition, sponsored by the Chicago Section, American Chemical Society, will be held in the Chicago Coliseum September 5-9, and will be built around the theme of: "A Half Century of Chemical Progress."

This will be the first time that any exposition of the chemical industry has tried to focus attention on the contributions which chemical science and industry have made to mankind during a span of 50 years, Dr. Marvin C. Rogers, director of research for R. R. Donnelley & Sons, and chairman of the exposition committee, said.

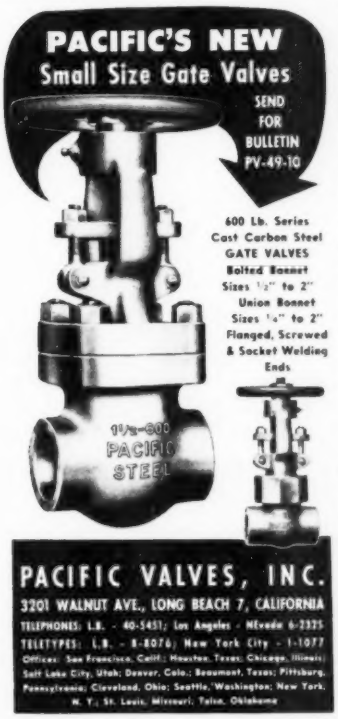
The exposition will run concurrently with the 118th national meeting of American Chemical Society.

Vitamin Capsules Now Made for Auto Engines

Development of a conveniently packaged fluid to give a quick engine start in cold weather has been announced by the California Oil Co.

The "vitamin" capsules, with aid of an applicator, enable an engine to start in less than 10 seconds in a temperature as low as 25° F. below zero.

Basically an ethyl-ether compound, its use is simplified and made safe by packaging in gelatine capsules.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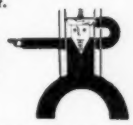

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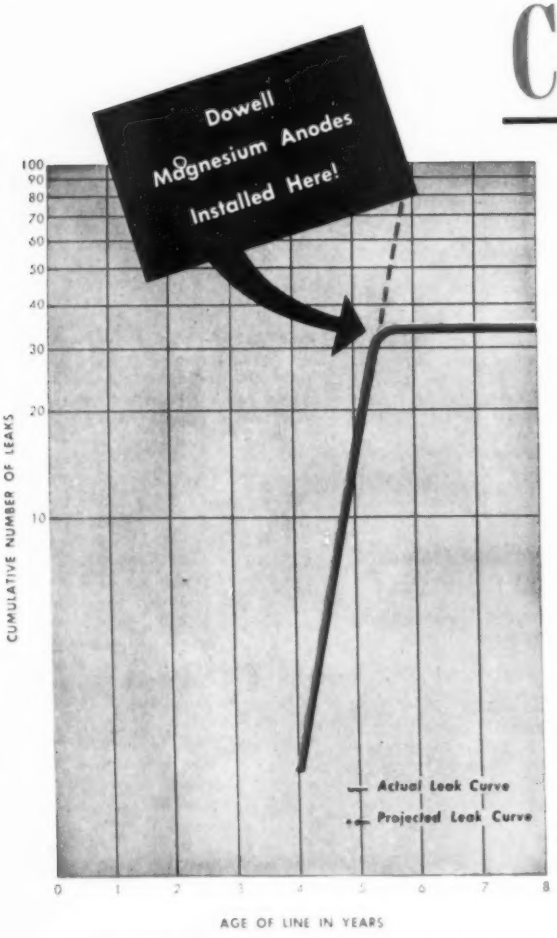

One way to lower pipeline maintenance costs is to reduce the number of leaks. The graph at left shows how a Gulf Coast city cut leaks in a 27 block, 2" galvanized piping system. The system was installed in 1940 and 1941. By April, 1946, leaks were appearing at an accelerated rate. *Then, magnesium anodes were installed!* Result: 2 leaks in the 30 days following installation and *no new leaks for the balance of 1946, 1947 and 1948!*

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PIPE LINES

Great Lakes Starts Work On 235 Miles of Line

In connection with its large expansion program, Great Lakes Pipe Line Co. is starting two new jobs totaling 235 miles of products line. These include 190 miles of 12-in. between Kansas City and Des Moines, and 45 miles of 8-in. between Cushing, Okla., and Tulsa. Contractors have been moving in equipment during the past week.

For the Kansas City-Des Moines line to parallel the company's existing system in the area, contracts have been let in 38-mile sections as follows: Trojan Construction Co. has the two southern sections; Brodie Construction Co. has the middle section; and R. H. Fulton & Co. has the two northern sections.

Trojan Construction has the contract for the Cushing-Tulsa line.

Mid-Valley Contracts for Seven Pipe-Line Stations

Mid-Valley Pipe Line Co. (Sun and Sohio), which awarded contract to O. R. Burden Construction Co., Tulsa, for the final 105-mile section of its 1,000-mile crude-oil pipe line from Longview, Tex., to Lima, Ohio, has announced that contracts have been awarded for seven pumping stations.

E. F. Morrill, vice president, announced the following contracts let: Pumping station at Longview, Tex., contracted to Thomas Bryan & Associates, Inc., Houston; Haynesville, La., station, contracted to Dresser Engineering Co., Tulsa; Abbeville, Miss., and Denver, Tenn., stations, contracted to Refinery Maintenance Co., Inc., Compton, Calif.; O. L. Olsen, Houston, will construct the Clarkson, Ky., pumping station and Dravo Corp., Pittsburgh, will build the Hebron, Ky., station. Contract for Mayersville, Miss., pump station was let to Refinery Maintenance Co. of Compton, Calif.

Radio-communications contract for the Mid-Valley line was awarded to Motorola, Inc., Chicago, Morrill said.

Mid-Valley expects work to start in early March on the No. 1 section of the line and the various pumping stations. Contracts cover construction of pumping-station buildings, plumbing, electrical wiring, grading, and landscaping, as well as installation of heavy equipment.

The final section of the line will be built from Longview, Tex., to Haynesville, La. *(The Oil and Gas Journal, February 16, 1950, page 135.)*

Stanolind to Extend Line Into North Scurry Region

Stanolind Pipe Line Co. announced last week that it will extend its West Texas facilities to include the northern portion of Scurry County, by building a 36-mile line into southern Kent County. The line will provide an additional outlet for production in the area, and will relieve serious transportation problems for the area.

The new line is an extension of the firm's present line to the Post field in Garza County. This initial extension will reach into the southern area of Kent County, 1 mile north of the Scurry County line, where four new oil wells are producing in the Cogdell field.

Stanolind built a trunk system into West Texas in 1943, and operates gathering systems in most of the new production fields of the area, in addition to the older fields.

Headquarters for the company's West Texas division is Lubbock. Stanolind gathers oil in Hale, Lamb, Lubbock, Garza, Hockley, Cochran, Yoakum, Gaines, Andrews, Winkler, Ector, and Ward counties, Texas, and in Lea and Chavez counties in New Mexico.

Southern Contracting Co. Acquires Whitaker Firm

Southern Contracting Co., Fort Worth, has acquired the O. C. Whitaker Co., and will continue in the pipe-line construction business with the same management, equipment, and field organizations.

Robert Thomas is president of Southern Contracting, with I. C. Little, Sr., vice president; J. C. Briscoe, vice president and secretary-treasurer; and J. C. Minyard, general superintendent.

Violence Ban on Project Approved by Tulsa Court

TULSA.—Attorneys for A. C. Holder Construction Co. and four unions agreed last week in Tulsa District Court to keep in force a court order banning union violence against pipeline workers laying a 59-mile line across Osage County, Oklahoma, for Great Lakes Pipe Line Co.

They also agreed to include a ban

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HOUSTON, TEXAS ATLANTA, GA.
L. H. Favrot — G. A. Peterkin —
J. W. Sharman — E. P. Gregory

against company violence in dealing with union representatives in a new restraining order. Union leaders were banned February 14 in a temporary order to keep their organizers completely off the Great Lakes project while the line from Barnsdall to Ponca City, Okla., is being laid.

Bechtel Corp. Opens New Tulsa Branch Office

Bechtel Crop., San Francisco engineering and construction organization, has opened Mid-Continent offices in the Philtower Building in Tulsa, and George Gibson, formerly the company's New York representative, has been named manager.

The decision to establish permanent headquarters in the Mid-Continent area resulted from the expansion of Bechtel operations in the region, mainly in the engineering and construction of refineries, chemical plants, and pipe lines.

In addition to projects in the petroleum industry, Bechtel Corp. is engaged in power development and construction of industrial and fractory buildings.

ICC Reports Decrease in Traffic, Revenue of Lines

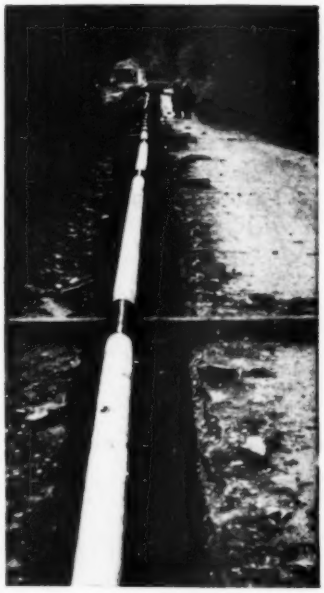
A report compiled by Interstate Commerce Commission's Bureau of Transport Economics and Statistics discloses that 46 pipe-line companies handled a total of 552,571,589 bbl. of oil in their lines during the third quarter of 1949 (July to September) and took in a total of $85,242,987 in transportation revenue. The total in oil transported was 91,369,792 bbl. below that of the same period in 1948, when 643,941,381 bbl. were moved by the firms.

Transportation revenues also were down during the quarter, compared with a year ago. Total revenue during the third quarter in 1949 was $1,736,927 under the $86,979,914 taken in during the comparable period in 1948.

Of the 43 companies, Humble Pipe Line Co. moved the most oil during the third quarter in 1949. The firm transported 50,877,779 bbl. compared with 74,549,256 bbl. the same quarter in 1948, or 23,671,477 bbl. less. Total revenues amounted to $7,394,212 compared with $9,367,312, or $1,973,100 less.

Greatest total revenue from transportation was earned by Stanolind Pipe Line Co. It received $9,621,608 for transporting 30,853,379 bbl. of oil. This compares with $9,255,862 earned during the same quarter in 1948, for moving 38,012,657 bbl. of oil.

The company showing the greatest percentage increase in transportation revenue was Sohio Pipe Line Co. Its



It Pays to Specify

TAPECOAT

. . . The Modern Protection for Pipe Joints, Service Connections, Mechanical Couplings, Large Bends and Large Diameter Pipe

TAPECOAT . . . the *coal tar* wrapping in handy tape form is the practical answer to engineers in solving many corrosion problems. Available in widths from 2" to 24", it's the one handy coating you can use right down the line from the smallest to the largest jobs and provide protection equivalent to the mill coating on the pipe. It's easy to apply TAPECOAT. The small widths are spirally wrapped . . . the large widths are cigarette-wrapped. No dirt. No mess. You save time, work, material and money.

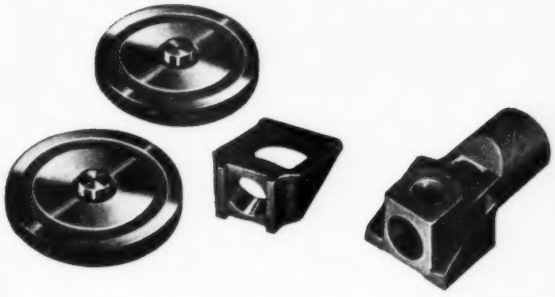
Write for details or ask for demonstration

*Reg. U.S. Pat. Off.

The TAPECOAT Company
1523 Lyons Street . Evanston, Illinois
New York Office
469 Fifth Ave., New York 17, N. Y.
Houston Office
Jas. E. Mayor Co.
514 M & M Bldg., Houston 2, Texas
Denver Office
175 Niagara St., Denver 7, Colo.

How Darling features prevent trouble and expense

Simplified Maintenance



DESIGNED for extreme simplicity, with all parts interchangeable, Darling Fully Revolving Double Disc Parallel Seat Gate Valves assure easy inspection and unsurpassed maintenance economy.

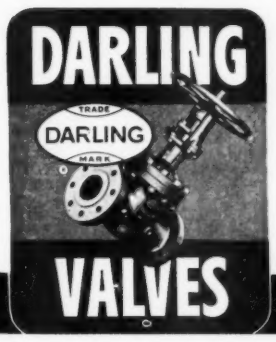
There they are—just four simple gate parts, two plain discs and two wedges . . . readily and quickly removed or replaced as a unit, without disturbing the valve body. Moreover, since the discs are entirely independent and interchangeable, new discs can be installed without laborious bench work or fitting. Likewise, seat rings are made with lugs for easy removal and replacement without removing the valve body from the line.

Extra deep stuffing boxes provide ample packing space. Independent gland bolts permit adjustment or replacement of packing without disturbing the stuffing box bolts.

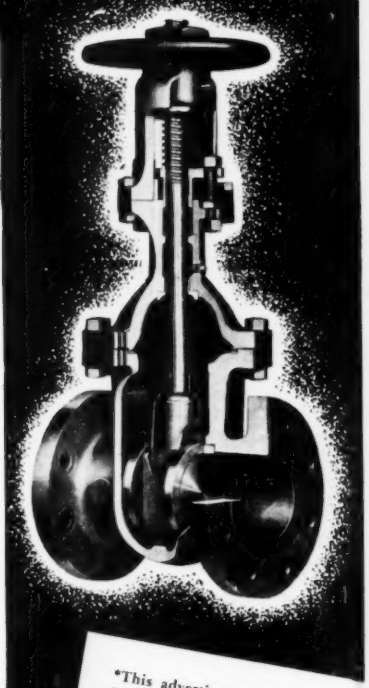
Finally, *all* Darling Gate Valve parts are made to established engineering standards, beginning with rigid metallurgical specifications, then controlled all along the way with gauges and templates for complete dimensional accuracy.

So for low maintenance cost and minimum parts inventory, for long-range economy in *every* way, specify Darling Fully Revolving Double Disc Parallel Seat Gate Valves.

DARLING VALVE & MANUFACTURING CO.
Williamsport 1, Pa.



Outline your service requirements and get complete information on Darling Valves of the proper type. Or, send for the complete 300-page Darling Catalog No. 17-M. It describes Darling Valves of all types for every normal or unusual service, and for pressures up to 1500 pounds. It's full of helpful information . . . Yours for the asking.



"This advertisement is one of a series showing how the unique Darling Fully Revolving Double Disc Parallel Seat Gate Valves answer the following critical operating problems:

- Positive, easy closing—regardless.
- Automatic adjustment for valve body distortion.
- Elimination of disc-to-seat friction and galling.
- Uniform wear distribution.
- Extreme simplicity.
- Greater service life.
- Simplified maintenance.

CORROSION RESISTANT VALVES

In addition to conventional iron, bronze and steel constructions, Darling specializes in valves for any corrosive fluid: iron body valves with special alloy trim; iron body, rubber lined, with special alloy trim; all bronze; and all special alloy. Darling's 50 years of experience in meeting unusual requirements is always at your service.

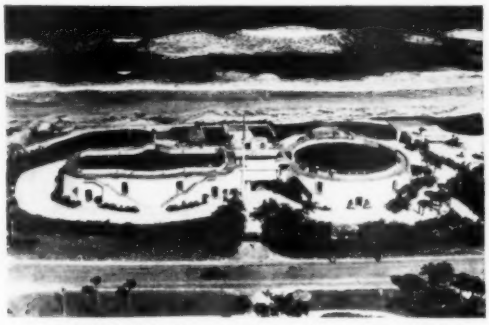
THE VALVE MARK OF QUALITY . . . WATCH FOR IT

TRAPPED IN A GIANT FISH BOWL

Submarine Portholes in the "Deep Sea" Tanks at Florida's Marine Studios Kept Watertight with U. S. Rubber Gaskets

MR. SHARK HAS NO PRIVACY in his 375,000-gallon home of many windows. They're sealed off against the tremendous pressures of the sea water—continuously changed at the rate of 300,000 gallons daily. U. S. Rubber Gaskets do the sealing.

MORE THAN 200 PORTHOLES use U. S. Rubber Gaskets. A special rubber compound makes them corrosion resistant . . . completely watertight under abnormally high pressures . . . sufficiently pliable to fill any irregularities in the flange.



THE OVERALL PICTURE. Marine Studios at Marineland, Florida, represent one of many highly specialized operations where U. S. Packings are performing an outstanding job. For every field, there's a complete line of U. S. Packings.

Salt water, oil, acids, destructive chemicals at high temperatures . . . whatever your packing problem involves, you can count on U. S. Packings to solve it. And "U. S." Engineers are always ready to assist you in both planning and installation. Write to

A PRODUCT OF

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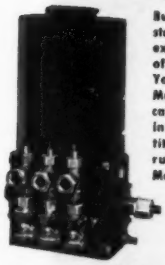
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

McCORD
Mechanical
LUBRICATORS
FOR SLUSH PUMP and DRILLING ENGINES
TYPE "SP"



Built to take it—to stand up under the extreme conditions of oil field service. You can depend on McCord "SP" lubricators to deliver oil in measured quantities without interruption. Specify McCord "SP".

For Sale by National Supply Company

Standard of the Oil Fields

McCORD
CORPORATION
DETROIT 11, MICHIGAN

revenues of $1,693,630 for moving 17,600,686 bbl. of oil during the third-quarter period in 1949 represented an increase of 73.5 per cent over the $976,250 earned for moving 13,080,148 bbl. of oil during the same period in 1948.

The following table shows the total transportation revenues taken in during the third quarter, 1949, and the total number of barrels of oil moved. (This list includes only those companies which earned $1,000,000 or more in revenues):

Company—	Total revenue	Total in bbl. moved
Atlantic Pipe Line Co.	$1,345,974	12,015,099
Buckeye Pipe Line Co.	1,715,757	34,612,670
Great Lakes P. L. Co.*	5,230,400	10,369,437
Gulf Refining Co.	5,756,619	32,772,626
Humble Pipe Line Co.	7,394,212	50,877,779
Interstate Oil P. L. Co.	4,598,351	39,079,825
Magnolia Pipe Line Co.	5,615,826	29,084,219
Ohio Oil Co. (P.L. Dept.)	2,977,372	26,632,939
Phillips Petroleum Co.*	2,047,211	5,625,406
Plantation P. L. Co.*†	2,610,523	9,194,744
Shell Pipe Line Corp.	5,588,902	25,770,321
Sinclair Refining Co.	6,598,608	26,737,126
Sohio Pipe Line Co.	1,693,630	17,600,686
Stanolind Pipe Line Co.	9,621,608	30,853,379
Texas-Empire P. L. Co.	2,112,505	14,209,586
Tex.-N. M. P. L. Co.†	1,657,253	11,608,296
Texas Pipe Line Co.†	4,422,750	36,029,524

*Primarily refined products. †Total delivered out of system

Transportation of Gas in Canada Would Be Profitable

Canadians would realize an annual transportation revenue of $14,500,000 through the medium of Westcoast Transmission Co.'s natural-gas line, it was stated at a recent Petroleum and Natural Gas Conservation Board's gas-export hearings in Calgary.

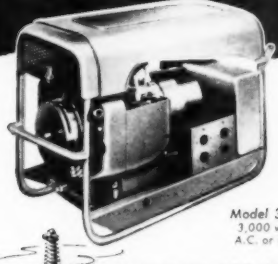
Previously it was estimated that out of the $114,000,000 in construction costs for the line, $95,000,000 would be spent in Canada. The total transportation costs of the gas, which after the fifth year would run approximately 60,000,000,000 cu. ft. annually, would in a large part accure to Canada in American dollars, it was evident from testimony given by William B. Poor, maintenance engineer, Ford, Bacon & Davis, U. S. engineering firm.

Poor estimated that the average transportation cost for the first 5 years on the line would be about $17,000,000 annually. Approximately $14,500,000 would be spent in Canada and the rest in the U. S. from the international boundary to Portland.

Three-quarters of the gas exported would be consumed in the U. S.; therefore, the great bulk of the transportation costs would be payable on the Canadian side of the border, in American funds.

The 1,406 miles of 30-in. line is planned from North Alberta, to Vancouver, B. C., and down into northern California.

ONAN Oilfield
Electric Plants



Model 3CK
3,000 watts
A.C. or D.C.

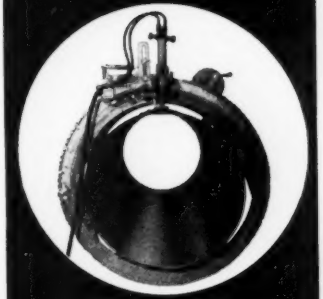
HEAVY-DUTY PORTABLE & STATIONARY MODELS
Diesel, Gas, Gasoline-powered

● ONAN oilfield electric plants provide dependable light and power for oil field applications. A complete range of A.C. and D.C. models . . . all conservatively rated for continuous, dependable service helps you choose the right plant for the job. Lightweight, air-cooled models from 400 to 5,000 watts; heavy-duty, water-cooled, gas-gasoline-driven plants from 4,000 to 75,000 watts. Air-cooled Diesel electric plants 2,500 and 5,000 watts. Water-cooled Diesels from 12,500 to 75,000 watts, powered by IH engines.

Write for Literature

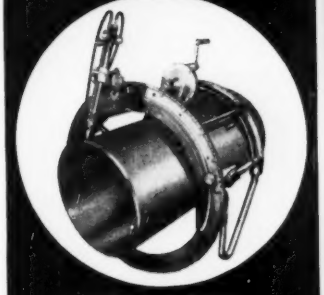
D. W. ONAN & SONS INC.
6794 Royalston Ave., Minneapolis 5, Minn.

CROSE
PIPE CUTTING AND BEVELING MACHINE



EQUIPPED WITH OUT-OF-ROUND ATTACHMENT

Machines to cut and bevel 16" pipe and over are furnished with out-of-round attachment.



EQUIPPED WITH STANDARD TORCH HOLDER

Machines to cut and bevel 14" pipe and under are furnished with Standard Torch Holder.

Crose pipe cutting and beveling machines are sturdy light weight construction made from cast aluminum. Simple operation. This machine has a split ring which enables it to be installed over the pipe for cut outs. The out-of-round cutting attachment allows you to cut true bevels on bent or egged pipe. Machines to cut and bevel pipe up to and including 36 inches in diameter are available for immediate delivery.

WRITE FOR BULLETIN BM1001

M. J.
CROSE
MANUFACTURING CO., INC.
2715 Dawson Rd. Tulsa, Okla.
M & M Building Houston, Tex.

NATURAL GAS

Hearing Set March 6 on Texas Illinois Proposal

A hearing on the proposal of the Texas Illinois Natural Gas Pipeline Co. to construct a 1,400-mile line from Texas to Joliet, Ill., was recessed last week by Federal Power Commission in Washington, D. C., until March 6, in order to give commission counsel time to prepare for cross examination of witnesses.

Witnesses testified at the opening of the hearing February 20 that additional natural gas is needed in areas which would be served by Texas Illinois in Illinois, Iowa, and northern Indiana.

The proposed lines would cost an estimated $120,942,000. About 90 per cent of the gas from the line would be delivered into the Chicago area.

Clarence J. Math, Davenport, Iowa, testified at the hearing that the Iowa-Illinois Gas & Electric Co., of which he is an officer, plans to add 7,200 space-heating customers this year and 9,200 next. The firm distributes gas in Rock Island, Moline, and East Moline, Ill., and in Davenport, Iowa City, Cedar Rapids, and Ottumwa, Iowa.

Supreme Court Refuses to Rehear East Ohio Gas Case

The United States Supreme Court last week denied the petition of East Ohio Gas Co. for a rehearing in its status-determination case.

The company was joined by National Association of Railroad and Utilities Commissioners and several individual state commissions in requesting a rehearing of the case, in which the Supreme Court had previously held that East Ohio is a natural-gas company, within the meaning of the Natural Gas Act, and therefore subject to Federal Power Commission jurisdiction.

The ruling was made despite the fact that East Ohio is a distributor of gas only and all of its activities are confined to the State of Ohio and are regulated by the regulatory commission of that state.

Alum Rock Seeks to Quit Service to United Natural

Alum Rock Gas Co., Port Allegany, Pa., has asked Federal Power Commission for permission to abandon natural-gas service to United Natural Gas Co., Oil City, Pa.

An earlier proposal by Alum Rock to increase its rates for gas sold to United Natural is the subject of another proceeding now before FPC. Alum Rock said it would seek to withdraw this pleading as soon as the application to abandon service is granted.

The application says that United Natural now has available sufficient quantities of gas from other sources and that the two companies have agreed to terminate their existing contracts on April 14, 1950. Alum Rock said that it has not yet determined what it will do with the facilities presently used for delivery of gas to United Natural.

In the other proceeding, Alum Rock's proposed natural-gas tariff was suspended by the FPC in December. This new tariff would have increased its rates for gas sold to United Natural by approximately $53,000 annually. A hearing in this case commenced February 20 but was continued to May 1 after Alum Rock filed its application for abandonment of service.

Court Rules on Bowling Green, Panhandle Gas Case

The Missouri Supreme Court ruled last week that a natural-gas distributing company does not have to pass on to its customers refunds received by the firm from a pipe-line company through reductions in wholesale gas rates.

The case involved Bowling Green (Mo.) Gas Co., and rate reductions that firm received in natural gas purchased from Panhandle Eastern Pipeline Co. Customers of Bowling Green claimed they were entitled to $24,065, which the company realized through wholesale gas rate reductions before it cut its own rates to consumers. Federal Power Commission ordered the company to cut its rates.

The money in question was legally collected by Bowling Green and therefore the company cannot be deprived of the money, the court ruled.

Independent Gas, Phillips Applications Consolidated

Application of Independent Natural Gas Co., proposing to abandon a compressor station in Texas and discontinue its sale of gas to Arkansas Louisiana Gas Co., has been consolidated by Federal Power Commission with the proceeding involving FPC's investigation of the natural-gas operations of Phillips Petroleum Co. A hearing in the Phillips investigation is scheduled to begin March 20 in Bartlesville, Okla., where both firms have home offices *(The Oil and Gas Journal, February 16, 1950, page 78)*.

Independent Natural, a subsidiary of Phillips, filed an application February 21, requesting permission to abandon its Lodi compressor station in Cass County, Texas, and to discontinue its sale of gas to Arkansas Louisiana from that station.

FPC said that it appears, from information submitted in connection with Independent's application, and from the staff in the investigation of Phillips, that Independent has abandoned the operation and sale and that Phillips is operating the Lodi station and making sales and deliveries of gas to Arkansas Louisiana.

Interim Rate Schedule of Michigan-Wisconsin O.K.'d

Federal Power Commission has allowed Michigan-Wisconsin Pipe Line Co.'s interim rate schedule, which provides a rate of 28 cents per 1,000 cu. ft. for all gas sold, to take effect as of February 7.

Last month the commission rejected the firm's proposed natural-gas tariff covering service through its recently completed Texas-Michigan pipe-line system, and at that time found that the 30-cent interim rate which had been in effect was excessive by not less than 2 cents per 1,000 cu. ft., and that the company should not be allowed to charge an interim rate in excess of 28 cents per 1,000 cu. ft. after February 6.

A hearing on the rejected tariff which provides a rate of 30 cents per 1,000 cu. ft., began in Washington, D. C., February 23.

FPC Consolidates Firms', Michigan Cities' Requests

The joint application of three Michigan cities which are seeking natural-gas supplies has been consolidated by Federal Power Commission. A hearing was started February 27 in Washington, D. C., on applications of Panhandle Eastern Pipe Line Co. and Trunkline Gas Supply Co. for authorization to build facilities to carry additional gas to the Midwest.

The cities, Port Huron, Marysville, and St. Clair, asked FPC in November 1948, to order Panhandle to establish a connection for the sale of natural gas to the Detroit Edison Co. which distributes manufactured gas to the three municipalities.

The current hearing involves a proposal by Panhandle to expand the capacity of its system in the Midwest to enable it to transport 250,000,000 cu. ft. of gas which it expects to receive from Trunkline. The latter company is seeking authorization to build a 740-mile Louisiana-to-Illinois pipe line.

Special technique assures quality of Kellogg "knock-down" vessels

ONE of the frequent causes of high cost in the field-construction of large refinery vessels does not really start in the field at all. Actually it occurs in the shop-fabrication of these "knocked-down" vessels.

Mis-alignment is the field man's bogey . . . mis-alignment, not only between segments of any one course of a vessel but also between the different courses themselves.

To preclude the possibility of saddling any constructor's field crews with the costly field correction of "misfits," Kellogg shops follow a special routine developed from both *shop and field* experience.

In effect Kellogg completely "builds" even the largest vessels right in the shop. Beyond matching individual segments to master templates, each successive course of every vessel is superimposed on the previously assembled course. "Knocked-down" vessels built in this manner for the field can't help but fit.

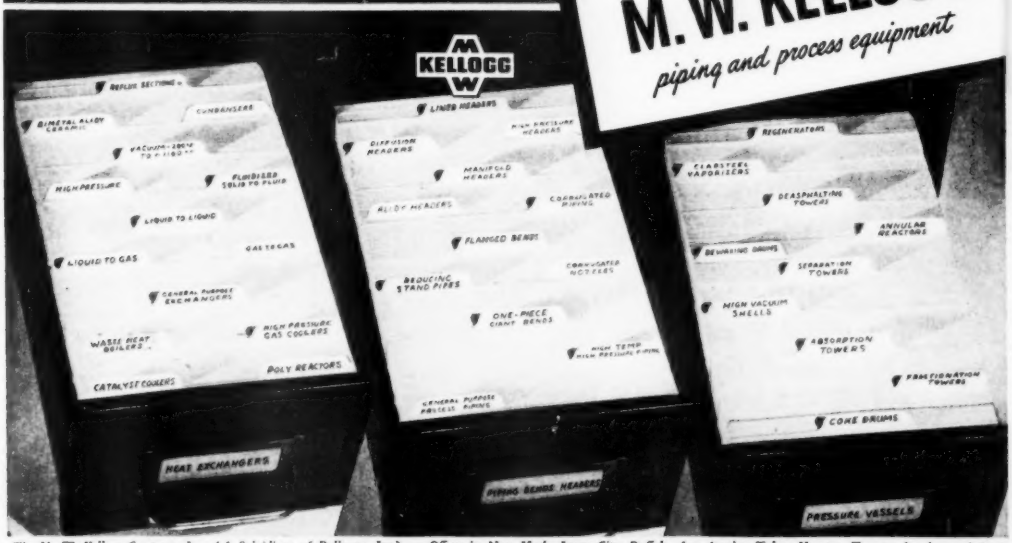
Such accuracy in fabrication has brought wide recognition of Kellogg quality in all types of vessels. It gives assurance of exact tray positioning and leveling and of close tolerances in nozzle positioning. It's another reason why Kellogg vessels—completely shop-built or shop built in "Knock-down" form—achieve high operating efficiencies and low maintenance records.

Illustrated—Alloy clad 25' diameter reactor being "Knock-down" fabricated in Kellogg shops.

To master temperature and pressure use

M. W. KELLOGG

piping and process equipment



The M. W. Kellogg Company, Inc. (A Subsidiary of Pullman, Inc.) — Offices in New York, Jersey City, Buffalo, Los Angeles, Tulsa, Houston, Toronto, London and Paris

H.C. SMITH ROCK BITS

give you full gauge hole

STRAIGHT TO BOTTOM

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TYPE K-2P
ROCK BIT

There are 10 types of H. C. Smith rock bits each with specially designed teeth to drill specific formations.

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GENERAL OFFICES, EXPORT OFFICE AND PLANT
COMPTON, CALIFORNIA

Among the

Drilling Contractors

Number of Rotary Rigs in Operation Drops Slightly

A total of 1,921 rotary rigs were in operation in United States and western Canada on February 20. This is nine less than on February 13, and 68 less than on the corresponding date last year.

Due to the Scurry-Kent counties activity, West Texas and New Mexico district continued to show the largest gain over a year ago, with a total of 681 rigs in operation. This is 166 more than on February 21, 1949. The Gulf Coast area, on the other hand, was off 127 over a year ago, with a total of 486 rigs running.

In the United States a total of 1,881 rigs were operating, 16 less than a week ago and down 81 from a year ago. Seven more rigs were in operation in western Canada on February 20, which made the total 80. This is 13 more rigs in operation in that area than the corresponding date in 1949.

ROTARY RIGS IN OPERATION*

(United States and Western Canada)

Area	Operating 2-20-50	Change from 2-13-50	Change from 2-21-49
Gulf Coast	486	+6	—127
W. Tex-N. M.	681	—2	+166
Ark.-N.La.-E. Tex.	128	—7	—21
Oklahoma	227	—10	+3
Kansas	100	—1	—7
Illinois-Eastern	60	+3	—15
Rocky Mountain	60		—26
Pacific Coast	135	—5	—54
Total United States	1,881	—16	—81
Western Canada	80	+7	+13
Total	1,961	—9	—68

*Courtesy Hughes Tool Co.

Kimbrell, Engstrand Form New Kansas Drilling Firm

A new drilling-contractor firm has been formed by W. B. Kimbrell, Tulsa, and Clinton Engstrand, Wichita. Operations are scheduled to begin in March with headquarters in Wichita.

The company, to be known as K. & E. Drilling, Inc., is now in the process of incorporation, and will operate exclusively as contractors.

Kimbrell has been an engineer with Baroid Sales Division, National

Canadian crew members of Regent Drilling Co., Edmonton, get a "breather" while well-shooting operations are in progress. The well is Chief Redwater Oils, Ltd., 1 Alberta Chief, 13 miles southwest of Edmonton. Front row, left to right: Berry Hannah, toolpusher, and Dale McBride, driller; and back row: Allan Curley, Ken Ganong, floormen; and Bill O'Hagan, derrickman.

USE 'BESTOLIFE IT'S BETTER

'BESTOLIFE—the Lead Seal Joint Compound used successfully in the Drilling and Refining Industries for years — is immediately available through more than 100 distributors in the U.S.A. Your nearest supply house field store probably has 'BESTOLIFE in stock for immediate delivery. Use 'BESTOLIFE — It's BETTER!

PLACE EXPORT ORDERS WITH YOUR SUPPLY HOUSE

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LINE SCALES

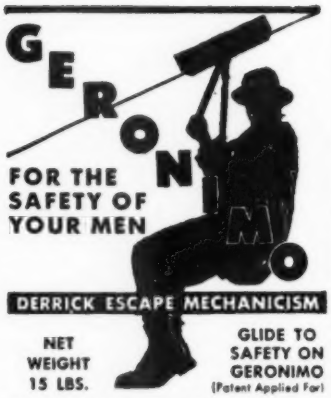
(Above) Super 500,000-lb. capacity, 14" dial. Below) Packer Special. Capacity 40,000 lbs., 6" dial. 18 other models for every drilling, well servicing, or work-over need.

20 MODELS to choose from

With a LINE SCALE you know the pull on the line, and the weight on the bit in pounds. Repeated tests prove the accuracy and dependability of LINE SCALE readings under all working conditions . . . even in areas of rapid temperature changes.

LINE SCALE CO., Inc.

Box 4245 **Oklahoma City** Ph. 6-1765
Gulf Coast Representative: Crenshaw Sales Co., Houston, Texas, Box 2031



DERRICK ESCAPE MECHANICISM

NET WEIGHT 15 LBS.

GLIDE TO SAFETY ON GERONIMO
(Patent Applied For)

GERONIMO will stand hardest wear and give unfailing protection to refinery and derrick men whose lives are endangered by fire, escaping gases or other hazards.

EASILY ATTACHED OR REMOVED
EXTRA STURDY CONSTRUCTION
QUICKLY STRADDLED
POSITIVE, INSTANT BRAKE
BRONZE "No-Spark" SURFACES
RECOMMENDED FOR ½" WIRE LINE

• Write for Illustrated Folder •

SOLD THROUGH YOUR SUPPLY STORE
— MANUFACTURED BY —
CHARLIE'S MACHINE WORKS
PERRY, OKLAHOMA

LONGER THREAD LIFE WITH Jimmie Gray COMPOUNDS

Each of these compounds is engineered to do certain jobs best. That's why you can always break the joint when you use Jimmie Gray Compounds.

MONEY BACK GUARANTEE

KANT-GALL TOOL JOINT COMPOUND

EXCLUSIVE 500-TON SPECIAL

LONG-LIFE DRILL COLLAR COMPOUND

SOLD AT SUPPLY STORES EVERYWHERE

PETROLEUM DISTRIBUTING CO.
BOX 203—HOUSTON, TEXAS
CHarter 5648

Lead Co., for a number of years. As head of field operations for the new drilling firm, he will have headquarters in western Kansas.

Engstrand, who with J. D. Davis organized the Kansas Sample Log Service in 1946, is a graduate of the University of Minnesota's School of Geology, and has spent 18 years in Kansas, Oklahoma, and Texas, doing geological work. Withdrawing from the Kansas Sample Log Service, Engstrand will serve as president of K. & E. Drilling. Kimbrell, a graduate in petroleum engineering from the University of Oklahoma, will serve as secretary-treasurer.

Jones-Simpson Drilling Co., Dallas

History. — Jones - Simpson Drilling Co., 1023 Mercantile Bank Building, Dallas, is a relative newcomer into the contract-drilling business. Early in 1948, Oklahoma Contracting Co., Inc., of which T. R. Jones is president, drilled its first wells in the Chico area of northwestern Wise County, Texas. These were contracted out to another firm. Rapid development of the area resulted in the formation of the Jones-Simpson Drilling Co., under a partnership which included T. R. Jones, C. J. Simpson, N. K. McFarland, and R. J. O'Connell.

Operations.—Jones - Simpson has completed 17 development wells in the Chico field, some of which have extended the field's proven limits. Two successful wildcats were drilled in Wise County. One of these was completed as an oil well and the other as a gas discovery. The company has three rigs operating in North Texas. These are medium-duty outfits, comprising a National 50, Unit Rig 15, and an Oilwell 64-B. In addition to the North Texas development, Jones-Simpson has one Wilson jackknife rig operating in the St. Elmo area of Illinois. The one rig has drilled eight producers for the company account, and associates. In the Diamond M area of Scurry County, West Texas, Jones-Simpson's first well, the 1 Dee Myers, Section 244, extended reef production about 1 mile north. The company's 2 Myers was drilling at this report.

Field personnel.—A field office is maintained at Chico, Tex. Earl McGill is drilling superintendent and D. C. Bryant is lease superintendent. At Mattoon, Ill., J. E. Wagstaff is superintendent of production. W. H. Seaman, of the Dallas office, is chief geologist.

Coats & Hearrell Drilling Co., Longview, Tex., has a rig running for Bobby Manziel on a wildcat test being drilled in the R. Fletcher Survey, 2 miles south of Tyler, Smith County, East Texas.

Decem Drilling Co., Oklahoma City, has moved a rig to a location 3 miles south of nearest production in the Elk City field, Beckham County, Oklahoma, where it will drill a projected 100,000-ft. test for its own account. Location, 1 W. F. Hall Estate, is in 11-9n-21w.

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Exploration and Drilling

Scurry County North End Gap Narrowed

IN northern Scurry County, Texas, the gap between the northernmost production in the North Snyder area and the southernmost production in the Cogdell area just across the Kent County line was almost halved by a new north extension from North Snyder.

The well that accomplished this is Progress Petroleum Co. of Texas 1 O. R. Buffaloe, located 467 ft. from the south and east lines of NE Section 565, Block 97, H&TC Survey, Scurry County. On drill-stem test at 6,787-6,808 ft., open 30 minutes, gas showed at the surface in 12 minutes and oil started flowing at the surface in 25 minutes. The well was allowed to flow into pits for 5 minutes through open 2-in. tubing. Estimates of the rate of flow were at around 15 bbl. per hour. According to reports there was no indication of formation water.

Top of the reef was called at 6,787 ft., which gives it a datum of —4,354 ft. It is to be drilled deeper, and is believed likely to have quite a few feet of pay section ahead before the probable water level is reached.

Sharon Ridge Canyon and the Diamond "M" producing areas moved a step closer to possible connection, as Diamond "M" was extended about ¾ mile on the southeast side. The well was J. C. Barnes 1-P Eiland, 440 ft. from north and west lines of SE Section 178, Block 97, H&TC Survey. Top of the reef was called at 6,767 ft., from an elevation of 2,329 ft., putting datum on the reef top at —4,438 ft. The well was drilled to total depth of 6,791 ft., and a 2-hour drill-stem test made at 6,753-91 ft.

Gas showed at surface in 9 minutes and maintained a good blow throughout the test, but no oil flowed. After the tool was closed the pipe pulling started, the well started to unload oil after 12 stands had been pulled, and continued to unload while the rest of the pipe was racked. Total recovery was 5,200 ft. of clean oil and 510 ft. of water.

On the southwest side of the reef trend, in Borden County, reports were a bit doubtful on the first attempt to connect up the Amerada Petroleum Corp. 1 Von Roeder producer in SE SW Section 103, Block 25, with the nearest production in the Sharon Ridge Canyon producing area to the east. R. E. Smith 1 Thompson, SW SW Section 102, just ¾ mile east of the Amerada well, topped the reef at 6,818 ft. or datum of —4,495 ft., which would be about 28 ft. lower than the Amerada producer.

A drill-stem test at 6,816-26 ft. recovered 270 ft. of oil, 360 ft. of heavily oil and gas-cut mud, and 60 ft. of salt water during a 90-minute period. The Amerada well was finally completed with a potential rating of 185 bbl. of 38 -gravity oil plus 33 bbl. of water. As a result of the reef top trend in the Smith 1 Thompson, it is reported that Amerada will make its next location south of the 1 Von Roeder, instead of moving east to offset the 1 Thompson.

Meantime the well that stirred up so much increased interest in the southwest trend, George P. Livermore, Inc., 1 Reinecke, about 5 miles southwest of the Amerada well, was completed with a potential rating of 1,487 bbl. per day of 46 -gravity oil. *(See The Oil and Gas Journal, February 23, 1950, page 219.)* The potential was calculated on basis of a 6-hour actual flow of 372 bbl. of oil through a ¾-in. choke. Gas-oil ratio was estimated at 1,000 cu. ft. per bbl. The significance of the difference between the 38 -gravity oil from the Amerada well and the 46 -gravity oil in the Livermore well was a matter of discussion. If the Amerada is an edge well, making water, from the same oil accumulation, the nearness to water might or might not be enough to account for the difference.

Geologists trying to estimate other reef trends in the region were just as much interested in a well many miles to the west, over in southwest Borden County. There a 2-mile northwest extension to the Vealmoor Canyon reef field along the Howard-Borden County line was indicated. Seaboard Oil Co. of Delaware et al 1 Hanks, NE NW Section 19, Block 32, T-3-N, T&P Survey, flowed oil for 49 minutes during a drill-stem test at 8,177-95 ft. Open-flow bottom-hole pressure varied from 1,400 to 2,500 psi.; shut-in bottom-hole pressure built up to 2,700 psi. in 15 minutes.

Vealmoor field is regionally downdip from the Scurry County producing areas. Many geologists figure there may be another long Canyon reef trend, roughly parallel to the Scurry reef, but farther out in the basin and therefore deeper from the surface for the same geological formation. All tests along the area of projected reef trend are being watched closely.

Charles J. Deegan

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

WEST TEXAS.—North of North Snyder field in Scurry County, Progress Petroleum Co. 1 Buffaloe, Section 565, 2 miles north of its dry hole in Section 503, was being watched as the possible beginning of another reef producing area spreading northeast 5 miles to the Cogdell area of southern Kent County. In Midland County, General American 1 Josie Peck, indicated triple-pay discovery and west extension to Pegasus field, found the water table in the Ellenburger on a drill-stem test from 13,309-99 ft.

TEXAS GULF COAST.—A major oil pool has been opened 6 miles east of Beaumont by John W. Mecom 1 East Beaumont Townsite Co., Stephenson County. The well flowed 18 bbl. of 42 -gravity oil per hour through a 3/16-in. choke on drill-stem test at 8,122-28 ft. in the Hackberry zone of the lower Frio formation. In the same county, Houston Oil Co. of Texas and American Republics Corp. finaled the 1 E. P. Lipscomb et al for a gas discovery 3 miles northeast of Mauriceville. It flowed 71,000,000 cu. ft. daily on open flow through perforations at 7,650-60 ft.

TEXAS GULF COAST

Orange County Gets Both Oil and Gas Discoveries

HOUSTON—A new oil pool has been opened in the Rose City area, Orange County, by John W. Mecom. The 1 East Beaumont Townsite Co., Stephenson League, 6 miles east of Beaumont, flowed 18 bbl. of 42°-gravity oil per hour through a 3/16-in. choke on drill-stem test at 8,122-28 ft. This wildcat was drilled to around 9,025 ft. and completion is in the Hackberry zone of the Lower Frio formation.

Meanwhile, in the same county, Houston Oil Co. of Texas and American Republics Corp. finished the 1 E. P. Lipscomb et al for a gas discovery 3 miles northeast of Mauriceville. The well was gaged for 71,000,000 cu. ft. of gas daily on open flow, with a flowing pressure on the tubing of 2,978 psi. The well is bottomed at 8,319 ft., has 5½-in. casing cemented at 7,725 ft. and is producing through perforations from 7,650-60 ft.

Midstates Oil Corp. has made a slight southward extension to the South Gillock field, Galveston County, with completion of the 1 Vionett Unit, T. W. Johnson Survey, Abstract 125. The well flowed at the rate of 265 bbl. of 39.1°-gravity oil through 11 64-in. choke, with 1,160 psi. pressure on the tubing. Hole is bottomed at 9,139 ft. and producing depth is 9,030-35 ft.

Yegua production has been opened in the Weesatche gas-condensate field of Goliad County at the W. O. Woodward 1 Housman and Ranger. The well was perforated at 4,756-66 ft. and flowed 24 bbl. of 44.3°-gravity oil per day through a 5/32-in. choke. Other production in the field is from the Wilcox zone ranging from 7,850 to 8,050 ft.

The Texas Co. 1 A. E. Humphreys, new oil discovery in northeastern Waller County, has ben gaged for 170 bbl. of oil daily through a 5/32-in. choke. Oil tested 48.8° gravity, and production is through perforations at 10,692-700 ft.

The 50 new locations include 6 wildcat starts, one each in Refugio, Harris, Lee and Wharton counties, and 2 in Victoria County. There were 3 successful exploratory wells completed, one each in Goliad, Newton and Waller Counties, while 10 were dry, one each in Bee, Calhoun, Live Oak, Refugio, Brazoria, Chambers, Fort Bend and Matagorda counties and two in Victoria County.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCATS

Goliad County: Gas discovery—Rock Hill Oil Co., Daugherty & Kidd and Stanolind Oil & Gas Co. 1 J. B. Wilhelm, Kilgore Sur., A-172, 5 mi. NW of Fannin, top pay 3,219 ft., TD 4,267 ft., perf. 3,219-24 ft., IP: 1,450,000 cu. ft. of gas daily, open flow, SIP 767 psi.

Newton County: New pay at Newton (Old Salem)—The Texas Co. 1 Newton County Lumber Co., Derrough Unit, J. D. Ray League, A-13, 10½ mi. SE of Call, top pay 10,965 ft. (Wilcox), TD 11,500 ft., perf. 10,965-004 ft., IP: 140 bbl. oil per day, 3/16-in. choke, GOR 2,400, 44.4° gravity.

Waller County: New oil pool—The Texas Co. 1 A. E. Humphreys, John H. Pierson Sur., A-389, 6 mi. SW of Magnolia, top pay 10,692 ft., perf. 10,692-700 ft., TD 10,773 ft., IP: 170 bbl. oil per day, 10/64-in. choke, TP 2,700 psi., 48.8° gravity.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Bee County: Arkansas Fuel Oil Co. 1 Norene L. McKinney et al, L. C. Randolph Sur., A-279, 1½ mi. SE of Pettus field, dry, TD 8,500 ft.

Brazoria County: Gulf Oil Corp. 2 Donald K. Poole et al, Allen Dome area, Wm. & Thomas Alley Sur., A-2, dry, TD 7,515 ft.

Calhoun County: Grady C. Clark, Jr., 1 Curtis Clark, Sr., I&GN Sur., A-94, 1 mi. NW of East Long Mott field, dry, TD 9,503 ft.

Chambers County: Kirby Petroleum Co. 1 Union National Bank of Houston, Joseph Lawrence Sur., A-168, 2½ mi. S of Cove, dry, TD 7,225 ft.

Fort Bend County: L. W. Callender 1 A. P. George, M. M. Ryon Sur., A-368, 5 mi. SE of Richmond, dry, TD 7,145 ft.

Live Oak County: Callery & Hurt 1 Nueces Valley Townsite Co., Jane Curry Sur. 8, A-143, ½ mi. E of Dinero, dry, TD 6,006 ft.

Matagorda County: Hinkle Drilling Co. et al 2 F. Cornelius, Sr., J. H. Scott Sur., A-86, 1 mi. NW of Midfield, dry, TD 9,170 ft.

Refugio County: Quintana Petroleum Corp. 1 Babette Dorn et al, Bonnie View Ranch Subd., T&A Galan Sur., A-29, dry, TD 6,807 ft.

Victoria County: Rockhill Oil Co. & Quin Oil Co. 1 D. L. Miller et al, John S. Hendershot Sur., A-183, 5 mi. SE of Telferner, dry, TD 5,620 ft.

Union Producing Co. A-1 Peter Rydolph et al, John F. Kemper Sur., 1 mi. NW of North McFaddin field, dry, TD 6,815 ft.

PERMIAN BASIN

New Prospect Narrows Gap In Scurry-Kent Reef Areas

MIDLAND—A new reef producing area or possible southwestern end of the Cogdell discovery was indicated at Progress Petroleum Co. 1 O. R. Buffaloe, SE SE 565-97-H&8C, which has gas in 12 minutes and flowed oil in 20 minutes on a 30-minute drill-stem test at 6,787-6,802 ft. It was allowed to flow into the pits by heads for 5 minutes but no estimate was made on production. A flow test was to be made later. Oil in the pipe was circulated out.

On derrick-floor elevation of 4,355 ft., the well had top of the reef at 6,787 ft., or minus 4,355 ft. Location is 3 miles north of North Snyder field, and 2 miles north of a dry hole in Section 503, also drilled by Progress. Top on the reef in the Cogdell discovery, 5 miles northeast of the 1 Buffaloe, was minus 4,341 ft.

In Kent County, Chapman & McFarlin 5 D. M. Cogdell, 715-97-H&TC, was drilling below surface casing. The company's 2 Cogdell, Section 716 and ½ mile east of the discovery, had total depth at 6,857 ft. in the reef lime on which top had not been reported. On a test, it flowed 550 bbl. of oil in 6 hours through ¾-in. choke.

Chapman & McFarlin 3 Cogdell, Section 715, ½ mile north of the discovery, completed for 985 bbl. of 41.9°-gravity oil a day, through ½-in. choke. Top of the pay was 6,710 ft., and total depth 6,811 ft. Casing was perforated with 100 shots from 6,708-38 ft. and acidized with 500 gal. of mud acid.

In southwestern part of the county, Slick-Moorman Oil Co. 1 E. H. Wallace, 28-5-H&GN, was drilling below 7,105 ft. in lime and chert. One source of information reported a reef top at 6,920 ft., while another source said the well had missed the formation.

In west-central Kent County, Lewis T. Lohman 1 J. W. Young, 98-G-W&NW, had total depth at 7,657 ft., which was thought to be Mississippian. Fractured lime and chert with fair fluorescence was logged from 7,640-57 ft., and operators prepared to drill-stem test the section.

George P. Livermore, Inc., 1 W. Reinecke, 53-25-H&TC, southeastern Borden County reef discovery, was shut in for storage after running several tests. Total depth was 6,798 ft. On test, it flowed 48.08 bbl. of oil and 23.68 bbl. of sediment the first hour; 28.63 bbl. of oil and 15.41 bbl. of sediment the second hour; 31.43 bbl. of oil and 12.75 bbl. of sediment the third hour; 41.54 bbl. of oil and 14.24 bbl. of sediment plus 3.5 bbl. of water the fourth hour; 51.01 bbl. of oil, 6.07 bbl. of sediment and 3.64 bbl. of water the fifth hour. After being shut in for 14 hours, it flowed 127 bbl. of oil in 2 hours, through 22/64-in. choke, cutting less than 1 per cent basic sediment, and was shut in.

Standard Oil Co. of Texas 1 T. L. Griffin "6," 35-25-H&TC, southeast Borden County test, on the Howard County line, ran a 90-minute drill-stem test from 8,833-55 ft. It produced a weak blow of air and recovered 25 ft. of slightly oil-cut mud. Mechanical trouble prevented a test at 8,555-8,900 ft., and operators were running another test from 8,838-8,900 ft.

East of Amerada Petroleum Corp.'s 1 Von Roeder, R. E. Smith 1 C. V. Thompson, 2-32-T3N-T&P, Borden County, topped the reef at 6,818 ft., or minus 4,495 ft., about 28 ft. low to Amerada's well. Operators were preparing to run a drill-stem test to total depth of 6,826 ft.

Two miles northwest of Vealmoor field, Seaboard Oil Corp. 1 Porter Hanks, 19-32-T3N-T&P, flowed an estimated 25-30 bbl. of oil an hour, and recovered 3,440 ft. of oil, on a drill-stem test from 8,177-95 ft. Operators were running electrical surveys to 8,195 ft., total depth.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

Ector County: New field—Eastland Oil Co. 1-S J. L. Johnson, 1,320 ft. from W. & 2,14 ft. from S lines, 37-44-T1S-T&P, 701 ft. NE Shell Oil Co. 1 Johnson, dry hole; TD 4,360 ft., elev. 3,083 ft., San Andres pay 4,305-60 ft., flowed 152.39 bbl. of 36°-gravity oil a day, ¼-in. choke, GOR 250 cu. ft., TP 50 psi.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Crosby County: Rogers Bros. and Stewart 1 W. H. Belding, 4-D15-WTRR, 1 mi. S 1 Wahlenmaier, dry, TD 2,952 ft., elev. 2,547 ft., San Andres 2,120 ft.

Garza County: Star Oil Co. 1 O. S. Ranch Unit 1, 84-5-GH&H Sur., dry, TD 8,019 ft., San Andres 1,910 ft., Glorietta 2,915 ft., Strawn 7,620 ft., Barnett 7,910 ft., Mississippian 7,980 ft.

Glasscock County: Humble Oil & Refining Co. 1 Myrtle Frost, 40-33-T5S-T&P, 13 mi. S Garden City field, dry, TD 10,600 ft., elev. 2,707 ft., Rustler 900 ft., Yates 1,390 ft., San Andres 2,370 ft., Strawn 9,400 ft., tentative Devonian 8,830 ft., Ellenburger 10,130 ft.

Kihble County: J. S. Michael 1 M. B. Patterson, Blk. 16, Peter Patterson Sur., A-2,030 ft., 18 mi. SW Junction, dry, TD 4,183 ft., elev. 2,277 ft., Ellenburger 3,978 ft.

Runnels County: L. M. Glasco 1 S. P. Woods, Sec. 80, H. N. Baggs Sur., 1½ mi. SE Rambo-Stevens area, 1½ mi. SW North Winters field, dry, TD 4,820 ft. in sand and shale, elev. 1,958 ft.

Saxon Exploration Co. 1 W. F. Lange, Blk. 10, N. Travis Sur., 10 mi. NE Ballinger, dry, TD 4,310 ft. in limestone.

Scurry County: Spartan Drilling Co. 1 J. H. Langford, 240-97-H&TC, 3½ mi. NW Diamond M field, dry, TD 8,210 ft., elev. 2,403 ft., first Pennsylvanian lime 7,056 ft., Mississippian 7,988 ft., Ellenburger 8,175 ft.

SOUTHEAST NEW MEXICO WILDCAT FAILURES

Eddy County: Humble Oil & Refining Co. 1 Federal-Wiggs, SW NE 31-24s-27e, 16 mi. S Carlsbad, dry, TD 14,865 ft., elev. 3,450 ft., salt 1,700-2,030 ft., Delaware lime 2,240 ft., Wolfcamp 9,120 ft., Pennsylvanian 10,875 ft., Devonian 13,160 ft., Simpson 14,510 ft., Ellenburger 14,769 ft.

Lea County: Amerada Petroleum Corp. 1-A Record, NW NW 33-19s-36e, 2½ mi. W Monument field, dry, TD 6,971 ft., elev. 3,674 ft., salt 1,780-3,060 ft.

TEXAS PANHANDLE (DISTRICT 10) WILDCAT FAILURE

Childress County: Stanolind Oil & Gas Co. 1 Steve Owens, SW NW 81-1-SPRR, 15 mi. NE Childress, dry, TD 7,384 ft., elev. 1,680 ft., DST on dolomite at 6,300-6,400

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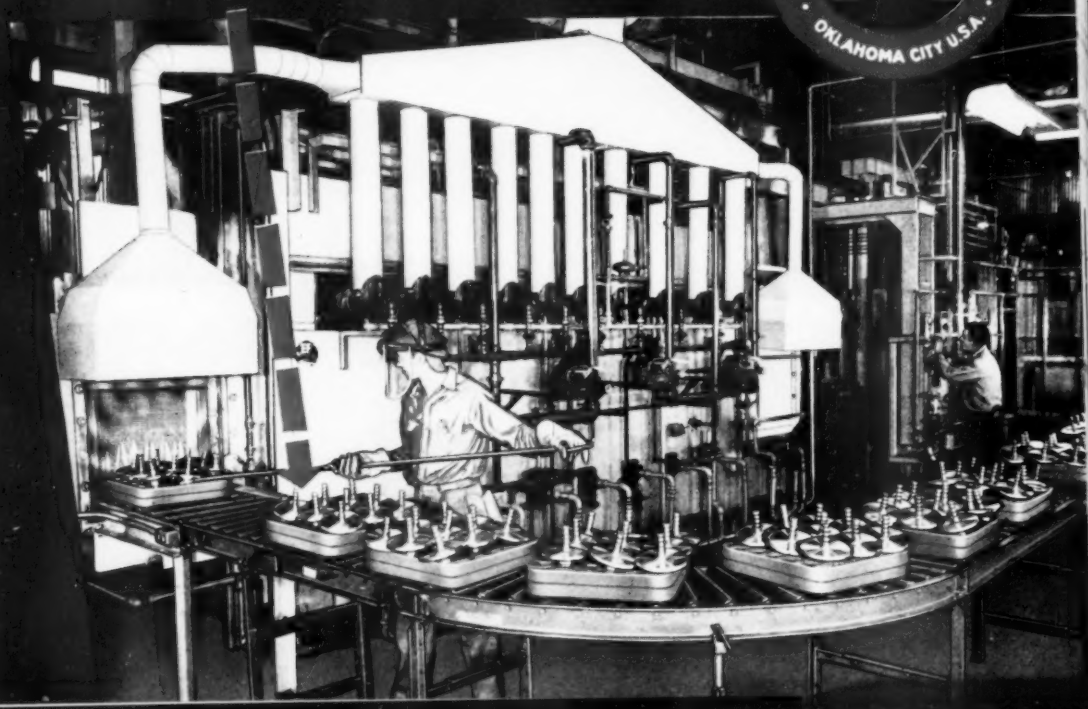

ft. recovered 755 ft. salt water, 180 ft. mud.

Roberts County: Sinclair Oil & Gas Co. 3 Lips "C," approximately SE SE 133-C-G&M, 14 mi. E, 2 mi. S of NW corner of country, dry, TD 11,432 ft., elev. 2,652 ft.

ROCKY MOUNTAIN

Running Pipe in Morgan County, Colorado, Test

DENVER—J. M. Huber Corp. is running casing on an interesting wildcat in the northeastern Colorado area after finding indication on electric log that the well may make a producer. The wildcat was drilled by Adams Drilling Co. and is 1 Lee, SW NE 2-2n-47w, in the Fort Morgan area, Morgan County. The well was drilled by Adams to 5,541 ft., total depth, in the Dakota (?) where operations were acquired by Huber for an unknown consideration. The well logged Hygiene 2,389, Niobrara 4,694, Timpas 4,993, Muddy 5,445 and Dakota 5,524 ft. Saturation was reported by Adams in the top of the Muddy but drill-stem tests failed in that formation. Adams is composed of a group of Fort Morgan, Colo., businessmen. The wildcat is of interest as another in the series of tests in the Denver-Julesburg Basin, where there has been considerable leasing and exploratory activity since discovery of oil across the line in Cheyenne County, Nebraska.

Location has been made for a third wildcat by The Ohio Oil Co. in its Denver-Julesburg Basin play. The well is located in the Sunol area, in the NE NE NW 9-14n-49w, 2 miles east of the company's recent Huntsman gas discovery. With location of this well, classified by Ohio as a new area, it is considered possible that production in this area may be on a series of small "highs" on a fold through this area. Ohio's first discovery was at Gurley, 5 miles north of Sunol, and seven oil producing wells with three failures have been drilled in an area of not over 160 acres. The Hunsman discovery, in the NW SW SE 7-14n-49w, 7 miles southwest of Gurley, was Ohio's next operation and the company found 54,000,000 cu. ft. of gas in the Third Dakota sand in this well. A second well 1½ miles northwest of this also found gas and is now shut in for further testing. A third well, 3 miles northwest of the Huntsman discovery and possibly in a new area, found oil in the First Dakota, gas in the top of the Third Dakota and oil in the base of that sand. The latter well is now being tested. Location has been announced by Ohio for 1 Ruehmann, SE NE NW 18-14n-49w, ½ mile southwest of the Huntsman discovery.

In the meantime leasing is continuing throughout the entire Denver-Julesburg Basin. Skelly Oil Co. is reportedly the last operator to enter the leasing in this basin. Shell Oil Co., Stanolind Oil & Gas Co. and others are reported continuing to lease in scattered areas. Shell has leased an estimated one and a half million acres in the past 2 months, with Stanolind reportedly acquiring as much as two million acres. Recent leasing has been in Grant, Arthur, Keith, and Perkins counties. It is now estimated that more than eight million acres has been leased in this basin, including areas in southeastern Wyoming and northeastern Colorado, in the past 9 months.

The Earl E. Evans wildcat at 1 Poore, C SE SW 6-3n-27w, wildcat in the Indianola area, Red Willow County, Nebraska, has been abandoned after water was found in the Kansas City section where saturation was reported. The well was drilled to 3,550 ft., total depth, in granite and casing cemented through the Kansas City below 3,191 ft. Casing was perforated with nine holes at 3,304-3,307 ft., with 21 holes between 3,216-3,223 ft., with 12 holes at 3,228-3,232 ft., and with 23 holes at 3,241-3,252 ft. Water with a scum of oil was recovered from each zone. The perforated sections were acidized with 1,500 gal. and the operator swabbed 6 bbl. of water per hour, with a small show of oil, and the well was then abandoned.

New locations.—There were 20 new locations, with 16 in Wyoming, 2 in Montana and 1 each in Nebraska and South Dakota. In Nebraska Cope and Associates made location for 1 Saiser, NW NE SE 2-12n-45w, a Sundance test in the southeast Chappell area, Deuel County. Other locations were for pool tests.

Completions.—There were 15 completions, with 13 in Wyoming and 2 in Montana. In Wyoming four of the wells were wildcat failures. Sinclair Oil & Gas Co. plugged its Pass Creek wildcat, Carbon County, with the well in Steele shale at 4,085 ft., total depth. Steep dips were encountered in the operation, which reportedly did not test Frontier, its objective. Markley-Snyder-Case et al plugged their Clareton wildcat, Weston County, after failing to find production through Dakota.

WILDCAT FAILURES IN WYOMING

East Lamb, Big Horn County: The Pond Petroleum Co. 1 Govt., SW SE NW 10-51n-92w; dry, 2,360 ft. TD; first Frontier 720 ft., Peay 1,620 ft., Muddy 1,789 ft., Dakota 2,115 ft., Fuson 2,140 ft., Lakota 2,280 ft., Morrison 2,270 ft.

Paint Rock area: All States Oil & Gas 1 Govt., Tract 85, 18-49n-91w; dry, 207 ft. TD; Frontier (?) 145-55 ft.

Pass Creek, Carbon County: Sinclair Oil & Gas 1 Pass Creek Unit, SE SE SW 28-21n-82w; dry, 4,085 ft. TD; in Steele shale.

Clareton area, Weston County: Markley-Snyder-Case et al 1 State, SW NW 36-43n-65w; dry, 6,164 ft. TD; Newcastle 5,884 ft.

N. CENTRAL TEXAS

McElroy Ranch Co. Opens Pope Field

WICHITA FALLS.—McElroy Ranch Co. completed its 1 W. K. Pope, Section 1,266, TE&L Survey, 7 miles northwest of Breckenridge, as a Marble Falls discovery, and the name "Pope field" has been suggested. It had top of the Marble Falls at 3,946 ft., drilled to 4,434 ft., then plugged back to 3,950 ft. On completion test it flowed 87 bbl. of 40°-gravity oil a day through 11 64-in. choke. There was no water, gas-oil ratio 1,175 cu. ft., and pressures were 175 psi. on tubing and 500 psi. on casing. Six feet of pay was perforated at 3,934-40 ft.

In Montague County, Edwin B. Cox and Jake L. Hamon 1 S. D. Howard, semiwildcat in the N. Kimbrough Survey, A-406, 4½ miles northwest of Montague, was drilling below 6,330 ft. following a 1-hour drill-stem test in conglomerate at 6,269-84 ft. Recovery was 90 ft. of slightly gas-cut mud, plus 300 ft. of salt water.

A third producer for Haws (Bend conglomerate) field was indicated by The Texas Co. 1 W. B. Lewis, L. McCulley Survey, and east offset to the discovery, 4 miles southwest of Montague. A drill-stem test from 6,270-6,333 ft. had gas in 12½ minutes and recovered 3,500 ft. of oil plus 350 ft. of heavily oil-cut mud. Casing was being run for completion. Length of the test was not reported.

Three miles west of nearest Mississippian production, in northwest Young County, Mid-Continent Petroleum Corp. and others' 1 Annie Leverman, Block 270, TE&L Survey, 7 miles southwest of Jean, topped the Mississippian at 4,842 ft. and drilled lime showing oil from 4,845-54 ft. A 50-minute drill-stem test of the section had gas in 6 minutes and oil in 40 minutes. Recovery was 2,400 ft. of free oil. Shut-in bottom-hole pressure was 2,250 psi. in 20 minutes. Operators set casing at 4,845 ft. and were waiting on cement. R. W. Fair and Don L. Choate completed the 2 M. C. Lee, wildcat discovery 8 miles northeast of Woodson, for a flowing potential of 61.25 bbl. of 42°-gravity oil a day. Perforations in the Caddo lime at 3,861-66 ft. were acidized with 500 gal. Gas-oil ratio was 600 cu. ft., and pressures were 65 psi. on tubing and 225 psi. on casing. The above test was through 1-in. opening. Location of the new well is just southwest of gas production.

One-half mile west of the Woodson townsite, Bishop Oil Co. 1 Sudie Daws, Section 965, TE&L Survey, completed in the Caddo at 4,234-42 ft., for a flowing potential of 150 bbl. a day through ¼-in. choke. Gravity of the oil was 41°, pressures were 250 psi. on tubing and 970 psi. on casing. Top of pay was 4,218 ft. and total depth was 4,586 ft. The well was originally scheduled to the Mississippian.

Two new 5,000-ft. semiwildcats were located by Grisham-Hunter Corp. of Abilene, in Block 652, TE&L Survey, 14 miles south of Throckmorton. The 2 Murphy-Kunkel was located 3,325 ft. from southwest and 931 ft. from northwest lines of the block, and is a west offset to the same operator's 1 well, which is a prospective Mississippian discovery. The 3 Murphy-Kunkel was spotted 1,925 ft. southwest of the 2 well, and 781 ft. from southeast and 1,400 ft. from southwest lines of the same block.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCAT

Shackelford County: T. P. Coal & Oil Co. 1 P. S. Fincher, Sec. 488, TE&L Sur., 12 mi. SW Woodson, TD 5,089 ft., top pay 4,000 ft., perf. 154 shots 4,000-4,150 ft., acidized 3,000 gal., flowed 4.68 bbl. of 41°-gravity oil a day, ¾-in. choke, GOR 190 cu. ft., CP 225 psi., TP 80 psi.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: G. E. Kadane & Sons 1 Robert Wolf, Lot 16, Blk. 3, Clark & Plumb Subd., 2 mi. SW Scotland, dry, TD 1,370 ft.

Baylor County: W. T. Waggoner est. 1 Waggoner "AAA," Sec. 8, GC&SF Sur., A-1596, 12 mi. NE Seymour, dry, TD 5,534 ft., elev. 1,157 ft.

Brown County: Viking Oil Corp. 1 N. D. Newton, John Sanders Sur. 162, 2½ mi. SW Cross Cut, dry, TD 1,550 ft., elev. 1,583 ft., lime with odor 1,527-31 ft., sand 1,531 ft., Palo Pinto 1,278 ft.

Clay County: Tom B. Medders and J. Newton Huff 1 Mary Parrish Fowler, Blk. 25, T. J. Belcher Subd., 3 mi. NW Bluegrove, dry, TD 5,818 ft.

J. T. West 1 E. Fuhram, Z. Whitesides Sur., A-712, 3½ mi. E Petrolia, dry, TD 2,021 ft.

Cooke County: Kimbell-Sims 1 John Ware, Wm. Goodnight Sur., A-414, 2½ mi. SE Woodbine, dry, TD 4,761 ft.

Comanche County: Ted Weiner 1 Gail Dudley, Hiram Brinlee Sur., 9 mi. W Comanche, dry, TD 2,770 ft., elev. 1,764 ft., base Barnett 2,635 ft., top Ellenburger 2,635 ft., no shows.

Haskell County: Thomas D. Humphrey 1 T. B. Roberson, 88-1-H&TC, 5 mi. N Stamford, dry, TD 5,323 ft., dry lime 5,221-60 ft.

P. S. Kendrick & James Fox 1 T. G. Kendrick est., 1-A-A. B. & M., 16 mi. E Stamford, dry, TD 4,475 ft.

Robinson Bros. 1 Brooks Early, H. Cunningham Sur. A-117, 12 mi. SE Haskell, dry, TD 4,880 ft., Caddo 4,850 ft., no tests.

Knox County: Ard Drilling Co. 1 Big Four Ranch, Sec. 11, H&GN, 10 mi. NW Truscott, dry, TD 4,878 ft., reef estimated 4,579 ft.

Montague County: D. H. Bolin 1 Edith Paine, F. Robertson Sur., A-620, 2½ mi. SW Spanish Fort, dry, TD 2,765 ft.

Stephens County: McElroy Ranch Co. 2 D. G. Stover "B," 3-8-T&P, 5 mi. NW Breckenridge, dry, TD 4,768 ft., Caddo 3,762 ft., Ellenburger 4,672 ft.

Taylor County: Drilling & Exploration Co., Inc. 1 L. E. Riney, 5-9-SPRR, 5 mi. SE Blair, dry, TD 3,700 ft., Flippen lime 2,764-85 ft.

Wise County: Champlin Refining Co. 1

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Stanfield, Austin & Williams Sur., A-3, 8 mi. SW Bridgeport, dry, TD 7,267 ft.

Young County: Ray Horany 1 M. Foehr, Sec. 188, TE&L Sur., 3 mi. SW Olney, dry, TD 1,194 ft.

MICHIGAN

Expansion Continues In New Paris Pool

MOUNT PLEASANT.—Extending Traverse oil production and Paris field into Section 27-16n-10w, Green Township, Mecosta County, Rex Oil & Gas Co. 1 Davidson, NW SW NW 27-16n-10w, appeared to assure continued drilling and expansion of this 1949-discovered pool in Sections 22 and 27. The Traverse lime objective was logged at 2,852 ft. and pay drilled from 2,885-91 ft. Hole was bottomed out at 2,891 ft., The well filled and flowed 109 bbl. of oil the first 12 hours after drill-in. Following acidization with 300 gal., it flowed 40 bbl. on a 9-hour test before being pinched back to the 75-bbl.-per-well allowable established for producers in this pool.

In Ionia County, Harley Ferrell's 1 Marion, SW NW NW 11-8n-5w, North Plains Township wildcat, logged a Dundee oil show at 2,989-90 ft. and was scheduled to be tested at that point after hole is plugged back from 3,050 ft., total depth, where water showed to 2,995 ft. The Dundee top was picked at 2,978 ft. and hole carried 100 ft. of free oil natural from the upper pay in the section on a 36-hour fill-up test. The test is located about 1½ miles southeast of T. F. Caldwell's North Plains Dundee oil pool in Section 4-8n-5w.

Of nine drilling permits approved by the Department of Conservation during the week ended February 17, seven were for tests in the shallow southwest area of the state, five classified as wildcats. In the basin area, one wildcat test and one development well permits were issued. Eighty-seven permits have been approved to date this year compared with 106 for the same period in 1949.

MICHIGAN SUCCESSFUL WILDCATS

Mason County, Summit Township: Welsh Oil Co. 1 Day, NW NE SE 26-17n-18w, Dundee 2,062 ft., 12 bbl. oil per day, TD 2,080 ft., PB 2,079 ft.

Oceana County, Weare Township: Welsh Oil Co. 1 Freeland, SW NE NE 10-16n-17w, Dundee 2,194 ft. (dry), TD 2,219 ft., PB 830 ft. in Berea topped at 810 ft., 116,000 cu. ft. of gas per day.

MICHIGAN WILDCAT FAILURES

Allegan County, Casco Township: Dale M. Leonard 1 Wark, NE NE SE 5-1n-16w, Traverse 1,196 ft., Monroe 1,393 ft. (?), dry, TD 1,670 ft.

Dorr Township: Augie Busk 1 Huff, NW SE NE 4-4n-12w, Traverse 1,676 ft., dry, TD 1,705 ft.

Lee Township: William C. Vandenberg, Jr., 1 Cleveland, NE SE NW 18-1n-15w, Traverse 1,182 ft., dry, TD 1,184 ft.

Martin Township: Norman L. Stevens 1 Brouard & Leep Comm., SE SW SE 11-2n-11w, Traverse 1,683 ft., dry, TD 1,698 ft.

Mason County, Grant Township: Robert Bond 1 Cameron, SE NE SE 13-20n-17w, Monroe 2,187 ft., dry, TD 2,216 ft.

Newaygo County, Lilly Township: Mercer Oil Co., Inc., 1 Sippy et al, NW NW NW 23-16n-13w, Dundee 3,010 ft., dry, TD 3,159 ft.

Wexford County, Cedar Creek Township: Sun Oil Co. 1 Nordenberg, C NE 25-23n-9w, Michigan Stray 1,344 ft., dry, TD 1,355 ft.

CALIFORNIA

New Gas Field Opened In Kings County

LOS ANGELES.—California chalked up its third discovery of the year this week. Shell Oil Co. made a natural gas discovery in 11-23s-21e, Kings County. The company's 1 Harvester Unit, 8 miles northwest of the Trico gas field, has been completed flowing at the rate of 4,150,000 cu. ft. per day through a ½-in. choke from perforated interval 2,802-2,805 ft. Producing horizon is believed to be the equivalent of the first Mya sand in the Trico gas field. Additional drilling will doubtless be done in the near future in order to evaluate the discovery.

A new fault block discovery has been made in the Tejon area of Kern County by D. K. Associates whose 1 Corral in 28-11n-18w flowed to sump at the rate of 200 bbl. a day of 28.9°-gravity oil. Production is coming from the Valvulineria California zone (Miocene), which was topped at 1,316 ft. This is one of several discoveries made in this area in the last year, but the first to be made in this zone. Operator is now rigging rotary for 1 Butte, another fault block play, 2 miles to the east in 26-11n-18w.

Showings have been reported in Superior Oil Co. 18-2 Government wildcat, Section 2-11n-28w, in the Cuyama Valley 3 miles northwest of the Russell Ranch field. Operator has not confirmed these reports and there is no casing on the rack. Nevertheless, Hancock Oil Co., Mohawk Petroleum Corp., and Oceanic Oil Co. are expected to get under way soon with a joint test on an 80-acre parcel ½ mile to the west of the Superior well in 10-11n-28w.

A second wildcat under close observa-

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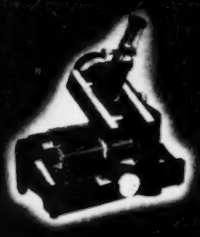

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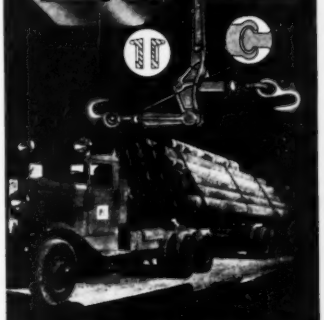

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tion in the Cuyama Valley is the Douglas Oil Co.'s 85 Cuyama in 16-9n-26w, 2½ miles southeast of the South Cuyama field. This well, drilling below 5,200 ft., is reported to be entering the Monterey shale, which is just above the Dibblee sand, productive in the nearby South Cuyama and Russell Ranch fields. Another 1,000 ft. should test the location.

Barnsdall Oil Co. has staked location for 41 Dessel, a deep Eocene test in the Guijarral field in Fresno County. The well will be drilled in the southern part of the field in 2-21s-16e. Present producing horizons are the Allison (Miocene) and Leda (Oligocene). At the same time Standard of California will attempt to extend Guijarral field production to the north in its 378-27 outpost in 27-20s-16e, $\frac{3}{8}$ of a mile north of the nearest production.

The Doheny, Battson and Lytle interests, formerly principals in the Los Nietos Co., sold last fall to the Union Oil Co. in one of the biggest oil deals on the Coast in many years, will continue active in the oil business. With R. S. Lytle acting as operator, the group has staked location for a wildcat in the Sylmer area of the San Fernando Valley, Los Angeles County. The project, to be known as 1 D.B.L.-Stetson-Sombrero, will be drilled in Section 21-3n-15w to about 7,000 ft. for a test of Lower Pico-Upper Miocene sands.

CALIFORNIA WILDCAT FAILURES

Kern County, Belgian Anticline area: The Texas Co. 27-29 Westpet Unit Five, 29-30s-22e, dry, TD 5,373 ft., elev. 1,423 ft.

Comanche Point area: Young Bros. & Associates 1 Tejon, 36-32s-29e, dry, TD 1,398 ft. in granite, elev. 838 ft.

Los Angeles County, Placerita area: Contratto Oil Co. 1 Jill, 29-4n-15w, dry, TD 1,681 ft. in gray sand, 45° dips, elev. 1,540 ft.

Solemint area: C. M. Rood 1 Anita, 14-4n-15w, dry, TD 2,492 ft. in Mint Canyon, elev. 1,745 ft.

San Luis Obispo County, Midway Peak area: Continental Oil Co. 1 Munsey-USL, 4-32s-22e, dry, TD 9,083 ft. in sand, elev. 2,876 ft.

Santa Barbara County, Cuyama Valley area: Richfield Oil Corp. 1 Homan C, 29-10n-27w, dry, TD 7,697 ft., elev. 2,973 ft.

Ventura County, Sespe Forks area: H. A. Ivers 14, 1-4n-20w, dry, TD 1,765 ft., elev. 728 ft.

EASTERN TEXAS

Pine Mills Test May Have Woodbine Oil

DALLAS.—Unofficial reports on Sohio Petroleum Co.'s 2 G. T. Turner, Gilleland Survey, indicated possible Woodbine production for the Pine Mills sub-Clarksville field of Wood County. Field sources indicated a recovery of about 700 ft. of oil in 15 minutes on a drill-stem test above 5,520 ft. The well was also credited with logging some 25 ft. of pay sand in the sub-Clarksville below 4,732 ft. On elevation of 433 ft., the only marker disclosed was the Austin chalk top at 4,648 ft.

On the field's south side, Sohio 1 W. L. Reed, same survey, was looking for the Woodbine, drilling below 5,100 ft. This well topped the Austin chalk at 4,594 ft., on elevation og 437 ft., which was said to be 40 ft. low to F. R. Jackson's field discovery on the Durrett farm. West of the Pine Mills townsite, Guiberson & Caraway 1 Burkett, Mansell Survey, was drilling at 6,102 ft., toward the Woodbine. The well had salt water in what was believed to be sub-Clarksville, from 5,616-21 ft., and was said to be running low.

In eastern Harrison County, Byrd Oil Corp. and Ed Hurley 1 Mrs. Josephine Rogers, Joseph Nations Survey, about 2½ miles west of the Waskom field, had good prospects for Travis Peak production. Early in the week a drill-stem test from 6,007-25 ft. recovered 1,700 ft. of 41.5°-gravity oil. Further details on the test were not disclosed. The well had reported small gas shows in the Hill zone at 4,900-25 ft. and in the Pettit at 5,945-5,940 ft.

Operators reported a porous and saturated section from 6,150-68 ft. but were unable to run a drill-stem test when the tool hit a narrow section up the hole in the Pettit lime. At last reports, it was coring out of the hole and plans were to drill to around 6,250 ft., run electrical surveys, set pipe and test through casing perforations.

The Texas Co. 1 S. C. Avant, Manuel Rionda Survey, and a 1,000-ft. northwest offset to the Tennessee Colony field discovery, was drilling ahead after setting 5,694 ft. of 9⅝-in. pipe.

Magnolia Petroleum Co. 1 Birdie Simpson, west extension attempt to the Lassater field, was drilling below 8,246 ft. in sand and shale, on a 9,750-ft. contract. A drill-stem test from 7,819-7,982 ft., using ¼-in. chokes, started flowing the 1,860-ft. water cushion after 13 stands of drill pipe had been pulled. Recovery in the pipe was 630 ft. of gas-cut mud with distillate odor. Pressures were 1,185 psi. flowing and 3,200 psi. shut in.

Skelly Oil Co. 1-B Frost, Micher Carpenter Survey, wildcat 17 miles southeast of the Carthage townsite and 1½ miles west of the Logansport, La., field, ran a drill-stem test on the "B" zone of the lower Pettit, from 6,067-80 ft. Gas showed in 20 minutes and in 1 hour recovery was 120 ft. of muddy distillate with 140 ft. of heavily distillate-cut mud. A second test, in either the "C" or "D" zone from 6,102-15 ft. recovered 10 ft. of mud cut with gas. Operators drilled ahead to 6,294 ft. and ran electrical surveys.

EAST TEXAS (DISTRICTS 5, 6 AND 6-P) WILDCAT FAILURES

Grayson County: James L. and James K.

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Anderson 1 Lee Graham, Chas. Quillon Sur., A-989, 1 mi. S Collinsville, dry, TD 3,401 ft., elev. 730 ft.

Limestone County: W. M. Coats 1 Claude Nussbaum, Pedro Varela Grant, 8½ mi. SW Mexia, dry, TD 2,548 ft., Buda 2,460 ft. by samples, Woodbine had oil and gas show.

Red River County: J. T. Sands, Ward Baker and S. J. Sells 1 Clara B. Evans, 10-acre tract, Becknell Sur., 750 ft. SE Stratton 1 Evans, dry, TD 1,825 ft., no shows.

Wood County: F. R. Jackson 1 W. J. Harrell, Wm. Wallace Sur., A-648, 3 mi. W Crow, dry, TD 6,854 ft., elev. 499 ft., Nacatoch 2,575 ft., Pecan Gap 3,450 ft., Gober 4,460 ft., Ector 5,575 ft., sub-Clarksville 5,985-6,150 ft., Woodbine 6,573 ft.

LA.-ARK.

Deep Test in Athens Nears Louann Salt

SHREVEPORT.—In the Athens field of Claiborne Parish, Gulf Refining Co.'s 1 Mamie Kinnebrew, deep test in 26-20n-7w, was nearing its objective in drilling below 11,283 ft. The Louann salt was expected between 11,283-500 ft. If the salt is reached without shows sufficient to test, operators had tentative plans to set production string for tests in two of the Cotton Valley sands which had commercial shows of oil in sidewall cores from 8,150-8,230 ft.

G. M. LeGrand 1 J. F. Yearwood, 7-14n-11w, Red River Parish, was shut down for orders at 996 ft. Barnsdall Oil Co. and American Production 1 Worley, new operation in 5-22n-8w, Claiborne Parish, was waiting on cement at 700 ft. Southwest Gas Production Co. 1 J. F. Welcon, 24-21n-3w, had total depth at 9,087 ft. and was shut in for orders.

In Webster Parish, Hunt Oil Co. and Stanolind Oil & Gas Co. 1 Lee Walker, 2-23n-10w, prepared to test Pettit perforations from 5,730-45, 5,765-72 and 5,775-85 ft. The section was acidized with 5,000 gal.

Edgar J. Barnheimer 1 Tremont Lumber Co., shallow Winn Parish test in 24-12n-2w, was waiting on cement at 1,184 ft., total depth. Cores from 1,145-58 ft. had shale with streaks of saturated sand. A total of 5½ ft. of oil sand was recovered. Top of the Wilcox was logged at 1,146 ft.

ARKANSAS SUCCESSFUL WILDCAT

Union County: New field, "Tubal"—Dual completion, C. H. Murphy & Co. 1 W. K. Gregory, SE SW 28-19s-18w, TD 9,500 ft., elev. 207 ft., perf. Cotton Valley 8,012-22 ft., flowed 224 bbl. of 43°-gravity oil a day, ¼-in. choke, CP 300 psi., GOR estimated 900 cu. ft.; perf. Smackover 9,278-88 ft., flowed 200 bbl. of 47°-gravity oil a day, ⅛-in. choke, TP 2,000 psi., GOR estimated 1,200 cu. ft.

ARKANSAS WILDCAT FAILURES

Little River County: Burnett Production Co. 1-A A. Hale, NW NW NW 35-12s-29w, dry, TD 3,327 ft., elev. 332 ft., Massive anhydrite 2,168 ft., Kilpatrick 2,287 ft., James 2,544-70 ft., Hogg sand equivalent 2,670 ft., Three Finger lime 2,690 ft., Travis Peak 2,705 ft., Cotton Valley 3,209 ft., Eagle Mills 3,240 ft., Paleozoic 3,299 ft.

Ouachita County: McAlester Fuel Co. 1-A Roy Ransdall, SE SE 24-14s-19w, dry, TD 3,300 ft., elev. 276 ft., Nacatoch 1,390 ft., sand 1,416 ft., annona 1,940 ft., Tokio 2,304 ft., James 2,430-54 ft., Hogg 2,597 ft., Three Finger 2,639 ft., Travis Peak 2,660 ft.

Union County: Marine Oil Co. 1 R. C. Davis, SE SW SW 36-17s-14w, dry, TD 2,619 ft., elev. 219 ft., Wilcox 1,150 ft., Midway 1,520 ft., Arkadelphia 2,032 ft., Nacatoch 2,240 ft., Saratoga 2,387 ft., base annona 2,580 ft.

OKLAHOMA

Deese Discovery East of Northwest Hoover Pool

THE area in the extreme southeastern part of Garvin County is attracting some attention with completions in the southeastern end of Northwest Hoover pool and a possible discovery still further east and south. W. E. Steelman 1 Baldwin, SE NE NE 34-1n-1e, topped a Deese sand at 2,490 ft. and cored at 2,490-2,540 ft. recovering 38 ft. of saturated sand. Crew has set casing at 2,490 ft. after a drill-stem test at 2,490-2,542 ft. had a recovery of 35 ft. of oil and 200 ft. of oil-cut mud. Preston Carter has completed three wells in 30-1n-1e, all making about 200 bbl. daily of 40°-gravity oil. However, these wells are Pennsylvanian at about 900-1,100 ft.

Sun Drilling Co. has surveyed drilling sites in NW NW of section 20-6s-5w, Jefferson County. These are offsets to the discovery well, Sun 1 Samuel, SW NW NW 20-6s-5w, completed in the Arbuckle with a pumping potential of 100 bbl. per day.

The Washita County wildcat, Stanolind Oil & Gas Co. 1 School Land, NE SW SW 36-9n-17w, is flowing gas estimated at 1,500,000 cu. ft. per day. Total depth is 13,501 ft. with casing set at 12,515 ft. Well was plugged back to 7,690 ft. and pay acidized through perforations at 7,498-7,510 ft., 7,518-45 ft., 7,602-20 ft., and 7,630-70 ft. Gas production is from the Pennsylvanian.

No official information is available but much interest has developed in the tight holes being drilled by Superior Oil Co. in the area southeast of Ringwood pool in Major County. Superior 23-23 Adkins, NE SW NW 23-21n-10w, about 2½ miles south and east of the pool, has been drilled to 7,372 ft. and casing set for tests of the Manning. Another test, Superior 63-30 Fuller, NE SW NE 30-21n-10w, about 4 miles south of the west portion of the field, has been drilled to 7,307 ft. with no other information released.

About ½ mile northeast of recent development southeast of Olive district in Creek County, Mitchell & Brown 1 Stone, SW SW SW 6-17n-9e, is going on pump to test Burgess sand pay after a drill-stem test at 3,027-40 ft. had a recovery of 1,200 ft. of oil. Well later swabbed 2 to 3 bbl. of oil per hour.

OKLAHOMA SUCCESSFUL WILDCATS

Creek County: Mosquito Creek area—Brosius & Hall 1 Bath, NE NE NW 13-17n-8e, IP 2,304,000 cu. ft. of gas per day from Skinner at 2,365-73 ft., TD 3,118 ft.

J. P. Booth 1 Hayden, SE NW NE 23-19n-9e, pumped 45 bbl. of oil per day from Red Fork at 2,163-80 ft., TD 2,220 ft.

Osage County: Waite Drilling Co. et al 1 Osage, SW SW SW 7-20n-11e, flowed 50 bbl. of 38°-gravity oil per day from Burgess at 2,122-34 ft., TD 2,136 ft.

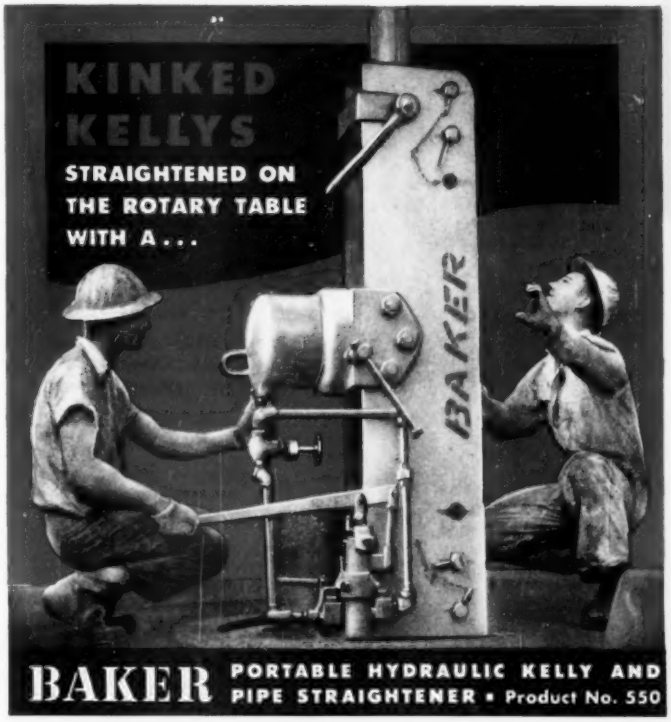
OKLAHOMA WILDCAT FAILURES

Comanche County: Gore & Wolfe 2 Clarke, NE SW NE 28-2n-11w, dry, TD 260 ft.

Hughes County: Clark C. Nye 1 Rogers, SW SW SW 1-5n-8e, dry, TD 3,388 ft., Calvin 640 ft., Booch 2,650 ft., first Gilcrease sand 2,844 ft., Wapanucka 3,098 ft., Union Valley 3,284 ft., Cromwell 3,352 ft.

Lincoln County: The Texas Co. 1 Copeland, SE NW NW 2-12n-3e, dry, TD 4,944 ft., Checkerboard 3,515 ft., Oswego 4,270 ft., Verdigris 4,405 ft., Red Fork 4,570 ft., Inola 4,700 ft., lime 4,805 ft., Mayes 4,905 ft.

N. T. Smith 1 Efaw, SE SE SW 29-16n-5e, dry, TD 4,071 ft., Hogshooter 2,422 ft., Layton 2,465 ft., Checkerboard 2,750



ft., conglomerate 2,770 ft., Oswego 3,400 ft., Prue 3,460 ft., Verdigris 3,533 ft., Skinner 3,542 ft., lime 3,695 ft., Inola 3,840 ft., lime 3,950 ft., Mississippi lime 4,050 ft.

Okfuskee County: Jordan 1 Standley, NE NW SE 29-10n-9e, dry, TD 3,957 ft., Senora lime 1,730 ft., lower Senora lime 1,880 ft., Bartlesville 2,450 ft., lime 2,685 ft., Booch 2,865 ft., Gilcrease 3,000 ft., Gilcrease sand 3,070 ft., Wapanucka 3,320 ft., first Cromwell 3,345 ft., Union Valley lime 3,420 ft., second Cromwell 3,432 ft., Pennsylvanian Caney 3,540 ft., Mississippian Caney 3,600 ft., Mayes 3,684 ft., Misener 3,933 ft., Hunton 3,935 ft.

Shaw 1 McNac, SW SE NE 9-11n-10e, dry, TD 3,850 ft., Inola 2,310 ft., Bartlesville 2,325 ft., lime 2,550 ft., Booch 2,750 ft., Gilcrease 2,928 ft., Gilcrease sand 3,043 ft. and 3,070 ft., sandy Wapanucka 3,282 ft., Cromwell 3,312 ft., Pitkin 3,442 ft., Caney 3,450 ft., Mayes 3,675 ft., Woodford 3,786 ft., Hunton 3,804 ft.

Aurora Gasoline et al 1 Turner est., NE SE SW 6-12n-8e, dry, TD 4,248 ft.

Falcon-Seaboard 1 Knight, NW SW SE 28-13n-10e, dry, TD 3,734 ft., Oswego 1,358 ft., Calvin 1,376 ft., coal 1,782 ft., Skinner 1,784 ft., Thurman 2,166 ft., Inola 2,295 ft., Bartlesville 2,310 ft., upper Booch 2,540 ft., lower Booch 2,608 ft., Gilcrease 2,845 ft., Union Valley 3,055 ft., Hunton 3,560 ft., Sylvan 3,585 ft., Viola 3,660 ft., first Wilcox 3,706 ft.

Payne County: Toklan Production 1 State "C," NW NW SE 16-17n-1e, dry, TD 5,147 ft., Pawhuska 1,745 ft., Hogshooter 3,595 ft., Layton 3,643 ft., lime 3,695 ft., Checkerboard 3,762 ft., lime 4,223 ft., Big lime 4,278 ft., Oswego 4,330 ft., Prue 4,406 ft., Verdigris 4,439 ft., upper Skinner 4,450 ft., lower Skinner 4,533 ft., Mississippi lime 4,673 ft., Woodford 4,723 ft., Misener 4,769 ft., Hunton 4,776 ft., Sylvan 4,840 ft., Viola 4,929 ft., dense 4,982 ft., Wilcox 4,999 ft., second Wilcox 5,084 ft.

Seminole County: Villines et al 1 Millsap, NE SE SE 23-7n-5e, dry, TD 3,139 ft., Belle City 980 ft., Calvin 2,665 ft., Senora 2,840 ft., Senora sand 2,885 ft., Earlsboro 3,094 ft., Earlsboro sand 3,103 ft.

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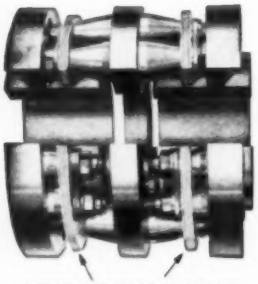

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SOUTHWEST TEXAS

New Gas Field for Jim Wells County

CORPUS CHRISTI — Rand Morgan has opened the new "Rand Morgan" field 8 miles southeast of Orange Grove, Jim Wells County, with completion of the R-1 fee. The hole was drilled to a depth of 5,775 ft. with 5½-in. casing set at 5,440 ft. Through perforations at 5,363-82 ft., the well flowed 30,000,000 cu. ft. of gas per day on open flow, and shut in with the shut-in pressure at 2,075 psi.

New pay has been opened in the Salt Lake field, Aransas County, with completion of the Renwar Oil Corp. 1 State Tract 105. Through perforations at 7,873-77 ft., the well flowed 163 bbl. of 42°-gravity oil per day through a 9 64-in. choke. Tubing pressure was 1,675 psi. and gas-oil ratio was 1,840 cu. ft. No water was made on the test and the pay was topped at 7,870 ft.

H. L. Hawkins has completed the 1 Singer Estate for a new oil pool discovery 23 miles southwest of Falfurrias, Brooks County. The well flowed approximately 205 bbl. of oil daily through 3/16-in. choke with 450 psi. pressure on the tubing. Hole is bottomed at 4,273 ft. and production is through perforations at 4,005-28 ft.

Testing operations are under way at the G. L. Reasor 1 Dale Johnston et al, wildcat test 4 miles west of Raymondville, Willacy County. Seven-inch production casing has been set on bottom at 7,578 ft. and perforated with sox shots from 7,028-30 ft.

Argo Oil Corp. has plugged back and perforated the upper sand and are now bailing with the well not looking so good in the 1 D. C. Chapa, wildcat test 1½ miles northeast of the Pantex field, Duval County.

The 43 new locations include 14 wildcat starts, one each in Brooks, Cameron, Duval, Hidalgo, Jim Wells, Nueces, San Patricio, Starr, Webb, Gonzales, Travis, Uvalde, Caldwell, and Williamson counties. There were 2 successful exploratory wells completed, one each in Aransas and Jim Wells counties, while 7 were dry, one each in Zavala, Kenedy, Nueces and Webb counties and 3 in Duval County.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCATS

Aransas County: New pay at Salt Lake—Renwar Oil Corp. 1 State Tract 105, State Tract 105, Popano Bay, top 7,870 ft., TD 7,933 ft., perf. 7,873-77 ft., IP: 163 bbl. oil per day, 9 64-in. choke, TP 1,675 psi., 42° gravity.

Jim Wells County: New gas discovery "Rand Morgan"—Rand Morgan R-1 fee, Block 5, Ragland Fram, 8 mi. SE of Orange Grove, TD 5,775 ft., perf. 5,363-82 ft., IP: 30,000,000 cu. ft. gas per day open flow, SIP 2,079 psi.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

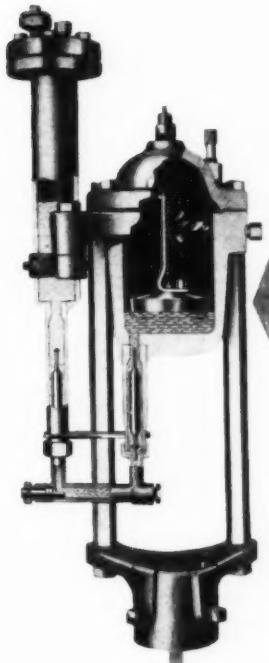
Duval County: Argo Oil Corp. 1 Saenz-State, SK&K Sur. 200, 21 mi. W of Benavides, 2¼ mi. SE of Pantex field, dry, TD 5,211 ft.

Joe C. Palmer et al A-1 J. F. Welder, J. Poitevent Sur. 213, 8 mi. NE of Freer, dry, TD 2,978 ft.

Ryan, Hays and Burke 1 Matilda I. Richardson, H&GN Sur. 17, 1 mi. E of Reyes field, dry, TD 4,143 ft.

Kenedy County: Humble Oil & Refining Co. B-1 Robert J. Kleberg, Jr., Tr., Patricio Pasture, TMRR Co. Sur. 42, 11½ mi. NW of Encino, dry, TD 11,020 ft.

Nueces County: S. H. Howell et al 1 Geo. J. Merriman, Sr., Wm. Robertson Farm



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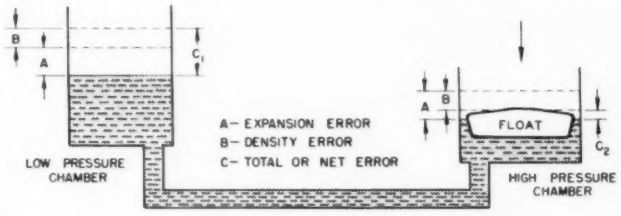

Diagram shows two distinct ambient temperature error factors (exaggerated for clarity) which affect the accuracy of mercury displacement type flow meters. On an increase in temperature, for example, the mercury expands and its level rises an equal amount (A) in both high and low pressure chambers. Mercury density also decreases because of the same increase in temperature, resulting in increased displacement (B) for a given differential pressure change. This increased displacement adds to error (A) in the low pressure chamber, causing a combined error C_1 — but *subtracts* from error (A) in the high pressure chamber, leaving only a negligible net error (C_2).

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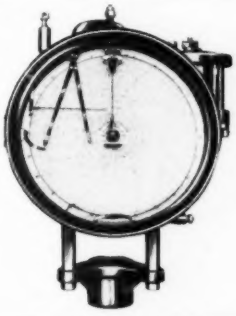

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DIFFERENTIAL-TYPE FLOW METERS

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Webb County: J. M. Anderson et al 1 Marshall Bros., Rusk Transportation Co. Sur. 674, 9½ mi. NW of Bruni, dry, TD 2,430 ft.

Zavala County: Rock Hill Oil Co. et al 1 E. Holdsworth, L. L. Everett Sur., A-66, 2 mi. N of Loma Vista, dry, TD 7,253 ft.

KANSAS

New Pool for Cheyenne View Area of Barton

J. C. DOZIER 1 Miller, SE SE NW 11-19s-12w, Barton County, has been completed as a Lansing-Kansas City producer to open West Cheyenne View pool. Well was completed with a potential of 129 bbl. per day through perforations at 3,295-99 ft. After treatment with 1,000 gal. of acid, well swabbed 7 bbl. of oil per hour for 8 hours. The hole was carried to a depth of 3,405 ft., cutting the Arbuckle at 3,374 ft. With casing set at 3,377 ft., the Arbuckle was tested and pumped 25 bbl. of oil and 55 bbl. of water per day on a 2-day test. Hole was plugged back to 3,300 ft. and completed in the upper pay. The new well is ½ mile west of Cheyenne View pool opener which was completed in the Arbuckle with the south offset finalled in the Lansing-Kansas City.

About ½ mile west of the Miller well, J. C. Dozier 1 Schwartz, NE NE SE 10-19s-12w, had a good show of oil in the conglomerate. Lansing was topped at 3,122 ft. but no shows were reported in the upper zones. Conglomerate was cut at 3,393 ft. and a 1-hour drill-stem test at 3,395-3,405 ft. had a recovery of 900 ft. of oil. Dozier has set surface pipe at another test, 1 DeGarmo, SW SW NE 2-19s-12w, about 1 mile north of the Miller well.

Further north in Barton County, Kiowa Drilling Co. had oil shows on two drill-stem tests at 1 Schneweis, 18-17s-11w. Top of the Lansing was called at 3,074 ft. and a 40-minute drill-stem test at 3,128-70 ft. had a recovery of 180 ft. of oil-cut mud. The other test, made at 3,230-43 ft. with tool open for 30 minutes, had a recovery of 120 ft. of oil-cut mud. Hole was carried to 3,348 ft. after topping the Arbuckle at 3,340 ft.

L. B. Stableford 1 Harter, NE NE SW 30-24s-13w, Stafford County, has been completed for 84 bbl. daily from the Simpson sand at 4,167-71 ft. to open Harter pool. Rice County also had a new discovery with the completion of Sohio Petroleum Co. 1 Reif, NW NE SW 31-18s-10w. Well was completed for 26 bbl. of oil and 26 bbl. of water per day from the Arbuckle, topped at 3,272 ft. Total depth is 3,279 ft.

In the area southeast of Doorstep pool in McPherson County, Texas Pacific Coal & Oil Co. continues testing 1 Krehbiel, SE SW SE 11-20s-3w, through perforations in the liner at 3,045-53 ft. Mississippi was topped at 3,014 ft. Casing was set to 3,015 ft. and hole drilled to 3,056 ft. Since pay below casing was making considerable amount of water, liner was run and perforated. After acid treatment, well swabbed and flowed 9 bbl. of oil and 1 bbl. of water per hour but later swabbed 3 bbl. of oil and 7 bbl. of water per hour for 24 hours.

KANSAS SUCCESSFUL WILDCATS

Barton County: Extension to Cheyenne View—Dozier 1 Miller, SE SE NW 11-19s-12w, IP 129 bbl. of oil per day from Lansing, TD 3,403 ft.

Stafford County: Petroleum, Inc., 1 Hufford, SE SW NW 28-21s-13w, IP 60 bbl. of 34.5°-gravity oil per day from Arbuckle, TD 3,713 ft.

KANSAS WILDCAT FAILURES

Butler County: Emery 1 Cain, NE NE SW 9-25s-3e, dry, TD 2,802 ft., Mississippi lime 2,765 ft.

Cowley County: Gulf 1 Baun, NE NW SE 15-11s-16w, dry, TD 3,521 ft., Sooy 3,398 ft., Simpson 3,486 ft., Arbuckle 3,514 ft.

Graham County: C & G 1 St. Peter, SE SE SW 1-9s-21w, dry, TD 3,732 ft., Heebner 3,325 ft., Lansing-Kansas City 3,363 ft., Sooy 3,677 ft., Arbuckle 3,705 ft.

Marion County: Veeder Supply 1 Theis, SE SE SW 14-19s-4e, dry, TD 2,386 ft., Mississippi chert 2,337 ft.

Rice County: Williams 1 Arensman, NE NE SE 30-18s-10w, dry, TD 3,355 ft., Lansing-Kansas City 3,002 ft., cherty Sooy 3,300 ft.

Rooks County: B & R 1 Sample, SW SW SE 27-7s-20w, dry, TD 3,530 ft., Arbuckle 3,447 ft.

Sedgwick County: B & R 1 Mosiman, SW SW SW 24-25s-2e, dry, TD 3,341 ft., Arbuckle 3,323 ft.

Stafford County: Plains Exploration 1 Morrison, SW SW NE 1-21s-14w, dry, TD 3,626 ft.

Palmer 1 Milton, NW NW NE 32-33s-13w, dry, TD 3,887 ft., Simpson shale 3,804 ft., Arbuckle 3,881 ft.

Trego County: Jones-Shelburne & Farmer 1 Rinker, NW SW NW 5-12s-22w, dry, TD 4,165 ft., Arbuckle 4,114 ft.

APPALACHIAN FIELD

Locations Pick Up In West Virginia

PITTSBURGH—Four new Oriskany sand ventures have been started in Steele district, Wood County, all located on the southeast quarter-section of the Belleville Quadrangle south of Lat. 39°, 05', and west of Long. 81°, 30'. They are: Godfrey L. Cabot, Inc., 1320 J. H. Brown, elevation 879 ft.; Columbian Carbon Co. 1143 Godfrey L. Cabot, Inc. (J. A. Ruble Tract) elevation 908 ft., and 1145 Godfrey L. Cabot, Inc. (A. E. Dye Tract), elevation 823 ft.; United Fuel Gas Co. 6465 O. H. Blair, elevation 1,078 ft. In the same district, Columbian Carbon Co. 1-1139 A. C. Radcliff et al had a show of gas in the Oriskany and will be shot. This company's 1-1140 F. B. Allman et al is drilling in the Corniferous lime which was topped at 5,119 ft. In Portland district, Preston County, Hope Natural Gas Co. 9391 Edna Murphy, which reported a good show of gas in the chert, has declined in volume and will be shot. In Lee district, Calhoun County, Scott Duffield 1 Harley R. Mace resulted in a good shallow sand gas well, gaging 1,185,000 cu. ft. in the Big lime, total depth 1,930 ft.

Thirty-nine new locations were reported: Otter district, Braxton County; Cross Creek district, Brooke County; Center district, Gilmer County; Union district, Jackson County; Elk and Jefferson districts, Kanawha County; Triadelphia district, Logan County; Hardee district, Mingo County; Adkin and Big Creek districts, McDowell County; Grant district, Pleasants County; Harper district, Roane County; McElroy district, Tyler County; Steele district, Wood County.

In South Franklin Township, Washington County, Pennsylvania, Penn-Washington Oil & Gas Co. 1 Geo. Bedillion was deepened from a depth of 2,617 ft. and encountered oil in the fifth sand good for 20 bbl. per day. The top of the sand was 2,932 ft., oil at 2,932-35 ft. and 2,942 ft. Total depth was 2,950 ft. This well was originally completed as a gas well in the Fifty-foot sand. In Napier Township, Bedford County, South Penn et al, Snee & Eberly 1 Jesse B. Miller, elevation 1,666 ft., is drilling at 6,650 ft. In Wharton Township, Fayette County, William E. Snee et al 3 Indian Creek Coal & Coke Co., elevation 2,615 ft., is drilling at 7,545 ft., and Georges Township, Orville Eberly et al 1 N. E. Murphy, elevation 2,560 ft., is drilling out cement at 6,435 ft.

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Snee 1 Geo. H. Blocher reported brown shale at 4,019 ft., show of gas and water at 4,105 ft., and drilling at 4,282 ft. Fox & Trimble 1 Edward Kite is drilling at 250 ft..

SOUTH LOUISIANA

Oil Found in New Fault Block SE of Barataria

NEW ORLEANS.—The California Co. has finaled the 17 Fleming Plantation for 251 bbl. of 37.1°-gravity oil daily through a 9/64-in. choke, marking a new discovery on an upthrown fault block. The well is located approximately ½ mile southeast of the Barataria field production, 1-16s-23e, Jefferson Parish. The well, which had an 18-ft. oil sand indicated by electric log, was drilled to a depth of 10,400 ft., and perforated for production at 8,452-62 ft. Tubing pressure was reported at 1,375 psi, and gas-oil ratio was 813.

Offshore from Cameron Parish, Magnolia Petroleum Co. has struck a flow of gas in the A-1 State Lease 1120, wildcat, in the same general area where Magnolia brought in two gas-condensate wells. Through perforations at 8,073-75 ft., operators estimated a flow of 19,000,000 cu. ft. of gas daily. Six more feet of casing were perforated and operators are running in production for final tests.

Tide Water Associated Oil Co. has staked a confirmation test for its Manila Village discovery in Jefferson Parish. The new well, 1 John Watt, 35-18s-24e, has a projected depth of 13,000 ft., where early last year Tide Water brought in a deep discovery with an open hole completion. Bottom-hole pressure was 12,000 psi.

In Acadia Parish, Hassie Hunt Trust has begun testing operations at the 1 H. L. Keane, western offset to their gas-condensate discovery, the 1 S. W. Robinson, 31-8s-1e. Five and one-half inch casing has been set at 10,679-82 ft. Total depth is 10,765 ft.

Atlantic Refining Co. is running a drill-stem test on its Acadia Parish wildcat, the 1 Pearl R. Cowen, with no results reported. Five and one-half inch casing has been set to 11,215 ft. and operators perforated at 11,030-40 ft. for testing.

The 27 new locations include 7 wildcat starts, one each in Jefferson, St. Charles, Terrebonne, Beauregard, and Pointe Coupee parishes and 2 in Acadia Parish. There were no successful exploratory wells completed; however, 3 were reported dry, one each in St. Landry, St. Martin, and Vermilion parishes.

SOUTH LOUISIANA WILDCAT FAILURES

St. Landry Parish: W. T. Burton 1 Milton Brown et al, 23-6s-3e, 2½ mi. SW of Opelousas, dry, TD 9,728 ft.

St. Martin Parish: Bates & Cornell 1 Levert St. John, 44-10s-7e, dry, TD 10,733 ft.

Vermilion Parish: Sohio Petroleum Co. 1 State Lease 915-Vermilion Bay, Sec. Vermilion Bay, dry, TD 12,810 ft.

MISSISSIPPI

Alabama Gets New Gas Field in Marion County

JACKSON—In Alabama, Harry L. Cullett has completed the 1 H. V. Lewis, 23-11s-14w, for a small gas well. This well is located approximately 30 miles north and slightly west of the old Fayette gas field, Fayette County, and approximately 25 miles northeast of the old Amory gas field, Monroe County. On initial potential, through 20/64-in. choke, the well flowed 620,000 cu. ft. of gas daily with tubing pressure of 298 psi. It is believed that the gas is producing from the Bethel section at 1,826-36 ft.

In extreme southern Clarke County, Alabama, it is reported that the Humble Oil & Refining Co. 1 Marion Davies et al, 15-3n-2e, encountered shows of heavy black oil in both the Eutaw and Upper Tuscaloosa sections. Operators have released no information, but reports indicate that on drill-stem test in the Eutaw recovered 15 ft. of very heavy black oil, along with 1,500 ft. of salt water. Test in the Upper Tuscaloosa resulted in the recovery of 400 ft. of heavy oil along with 600 ft. of salt water.

Approximately 1½ miles northwest of Ellisle field, Adams County, Mississippi, Humble Oil & Refing Co. 1 Alberta Robinson, 20-5n-3w, has been drilled to a depth of 7,116 ft. and 7-in. casing set at 6,573 ft. No information has been released on the test, but the persistent rumors are that 8 ft. of oil sand were encountered in the Wilcox. It is also reported that testing operations are under way, but no results have been reported. It is possible that this well could be an extension to the Ellisle field.

The Carter Oil Co. 1 J. L. Wilson, Mississippi's newest discovery, 30-12n-3e, Yazoo County, has been making some salt water. It is believed that this is due to mechanical failure rather than sand conditions.

MISSISSIPPI WILDCAT FAILURE

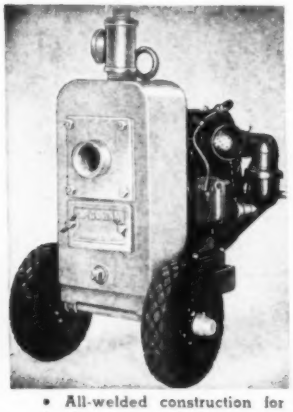
Adams County: Dorris Ballew, Inc., 1 W. R. Barksdale, 26-5n-3w, dry, TD 7,014 ft.

ALABAMA SUCCESSFUL WILDCAT

Marion County: Gas discovery—Harry L. Cullet 1 H. V. Lewis, 23-11s-14w, TD 2,302 ft., producing from Bethel sand believed to be at 1,826-36 ft., IP: 620,000 cu. ft. gas daily, 20/64-in. choke, TP 298 psi.

GEORGIA WILDCAT FAILURE

Seminole County: Mont Warren 1 Grady Bell, Land Lot 61, 27th Land District, hole cratered, TD 194 ft.



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A-76

OHIO, KENTUCKY

Gas Wildcat Shut in for Lack of Pipe-Line Outlet

COLUMBUS—B. H. Putnam et al topped the Niagara lime at 4,014 ft. and drilled to 4,170 ft. without reporting any Oriskany sand in their wildcat on John P. Griffin, Fr. 3, Troy Township, Athens County. A small gas showing in the shale was shot with 1,000 lb. E. P. 118, and the well gaged 400,000 cu. ft. 1 hour later. As there are no lines near, the well will be shut in for future use.

Sidwell Bros. 2 T. A. Pletcher, Section 25, York Township, Morgan County, gaged 1,150,000 cu. ft. from the Medina sand, which blew down to 750,000 cu. ft. The well was shut in the casing 1 hour after shot at 1,000,000 cu. ft.

The most concentrated drilling in the state now is in a small area between the towns of Roseville and Crooksville in Harrison Township, Perry County. Twelve wells are drilling, and nine additional locations have been staked and are being prepared for drilling. Production is Pennsylvania Grade oil from the Clinton sand at 3,500 ft.

Stone Creek Brick Co. has staked a location for a second test, a mile west of its 1 Chas. Snyder, on Chas. E. Mezir, Lot 18, Jefferson Township, Tuscarawas County. The 1 Snyder is still shut in and testing for rock pressure.

Sixteen wells were located for the week with Perry County having four, Tuscarawas three, and Morgan two. Wells completed totaled 16, with Cambridge and Mt. Vernon fields have four each.

EASTERN KENTUCKY

ASHLAND—In Breathitt County, in SE SE Salyersville Quadrangle, United Carbon Co. completed 23-1668 E. J. Evans fee for a small well in the Weir (Mississippian) sand. Test has been initialed for 5 bbl. per day along with 189,000 cu. ft. of gas from the Big lime. Total depth is 1,686 ft. with the Weir topped at 1,579 ft. This well marks the second for the area.

In northern Lawrence County, 5-U-82, W. S. Perry et al are drilling at 1,356 ft. on 1 Walter Young, semiwildcat test for the Bolts Fork pool area. Prospective producing zone is the Berea sand but test may be taken on into the Corniferous lime which, in this region, has had very few tests.

In Menifee County, and situated along Black Stand Creek of Indian Creek, George McNabb et al are drilling at 900 ft. and looking for top of Corniferous lime. This is a wildcat test north of the Indian Creek pool.

WESTERN KENTUCKY

OWENSBORO—In South Morganfield pool of Union County, Sun Oil Co. has completed 5 McBride, 1-N-19, with an initial production of 150 bbl. per day from the Waltersburg at 1,830-59 ft. In the same section, Carter Oil Co. 1 W. H. Hagan, 200 ft. north line and 1,360 ft. west line, has had shows in three pays. A 2-hour drill-stem test of the Pennsylvanian at 1,102-50 ft. had a recovery of 1 ft. of oil and 25 ft. of oil-cut mud. A 2-hour drill-stem test of the Waltersburg at 1,820-60 ft. had gas in 80 minutes and recovered 270 ft. of oil and 240 ft. of muddy oil. Another 2-hour test of the Tar Springs at 1,917-40 ft. had gas in 45 minutes and recovered 300 ft. of oil and 120 ft. of oil-cut mud. At last report, well was drilling at 2,241 ft.

On the south side of Guffie pool in McLean County, Miller & Shiarella and Ashland Oil & Refining Co. 2 L. Bennett, 21-N-27, has been completed in Jackson sand at 1,870-85 ft. for an estimated 75 bbl. per day on pump.

The deep McLean County cable-tool test, Miller & Shiarella and Ashland 5 Elizabeth Paris, 17-N-28, is drilling below 3,844 ft. after a show of oil in the Devonian at 3,750-91 ft. In Section 16, same operators have completed 5 Smith in the Pennsylvanian for 20 bbl. per day and 11 Wright for 75 bbl. per day from the Jackson.

WESTERN KENTUCKY SUCCESSFUL WILDCAT

McLean County: Miller & Shiarella and Ashland Oil & Refining Co. 5 E. C. Smith, NE SW SE 20-N-27, IP 20 bbl., Pennsylvanian sand, 870-89 ft., TD 905 ft.

WESTERN KENTUCKY WILDCAT FAILURE

Ohio County: C. F. Robb et al., 1 W. Murphy, NE NW SE 15-M-34, dry, TD 673 ft.

INDIANA

EVANSVILLE—Posey County has a prospective pool opener in the southeastern part of the county between East Stooker and Stooker pools. Superior Oil Co. 1 Phillip Jordan, SE SW NW 4-7s-12w, swabbed at the rate of 4 bbl. per hour from Cypress sand at 2,290-2,300 ft. Pay has not been shot. Well is on pump for further tests. Superior is drilling near pay at 1 George Jordan, the southeast offset and Walter Duncan is drilling below 1,565 ft. at 1 Lydia Neolle, the south offset. Duncan has staked an east offset, 1 R. Baxter.

In the area east of Princeton pool in Gibson County, George Pappas and Aurora Gasoline Co. 1 Nelson, SW SW NE 3-2s-10w, had a recovery of 30 ft. of clean oil and 45 ft. of oil-cut mud with no water on a 75-minute drill-stem test of the Cypress at 1,740-45 ft. Operator has set pipe for further testing.

Union-Bowman pool in the northern part of Pike County has a new pay for the west side of the pool. Wabash Petroleum Co. 4 Troxler, 670 ft. north and 330 ft. west SW SW 29-1n-9w, bailed at the rate of 5 bbl. of oil per day natural. Operator has set pipe for further tests of Salem lime pay at 1,935-39 ft.

In the Plainville pool of Daviess County, B. L. S. Drilling Co. 8-A Plainville unit, NE SW SE 2-4n-7w, has been completed in the Aux Vases at 720-39 ft. with an initial production of 110 bbl. per day on pump after treatment with 500 gal. of acid. This is a twin to 8 Plainville unit, which is making a very good well in the McClosky at 788-98 ft.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D.C. Notice is hereby given that the lands listed herein are offered through sealed bids on the terms hereinafter specified, to qualified bidders of the highest cash amounts per acre as a bonus for the privilege of leasing the lands. All bids must be submitted to the Director, Bureau of Land Management, Washington 25, D.C., on or before 1 p.m. of the date set out herein. Each bidder must submit with the bid one-fifth of the amount bid in cash or by certified check on a solvent bank or by money order made payable to the order of the Treasurer of the United States, and file the showing of qualifications to receive a lease required under 43 CFR 192.42 (a) (2) and (a) (3), Circular 1730. The envelopes should be plainly marked that they are not to be opened before the date and hour set out herein, and should show the name of the field. No bids received after the hour fixed herein for receiving bids will be considered. The remainder of the bonus and the annual rental must be paid and an acceptable surety bond in the sum of $5000 must be furnished by a successful bidder prior to the issuance of a lease. The deposits of the other bidders will be returned upon acceptance of the successful bid. Bidders are warned against violation of section 1860, Title 18, U.S. Code, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids. Royalties payable to the United States will be at the rate of 12½ per cent. Annual rental will be at the rate of $1.00 per acre. Copies of the form of lease to be issued will be mailed upon request, or may be obtained from the offices of the Oil and Gas Supervisor, U.S. Geological Survey, 239 Federal Building, Tulsa, Oklahoma. Title to these lands was acquired by the United States, and they comprise the site of the Cactus Ordnance Works Military Reservation, Etter, Texas. Jurisdiction over the oil and gas deposits therein was transferred to the Department of the Interior under authority of Executive Order No. 9337 of April 24, 1943, by Public Land Order No. 590 of June 14, 1949. The lands are offered in six parcels described as follows: Parcel No. 1. Acquisition Tract 18: All that part of section 20, Blk. 2-T., T. & N. O. RR Survey, Moore County, Texas, lying East of U.S. Highway No. 287 and South of the County line between Moore and Sherman Counties, containing 105.87 acres, more or less. Parcel No. 2 Part of Acquisition Tract 12: The W. 891 ft. of the SW¼ of section 28, Blk. 2-T., T. & N. O. RR Survey, containing 54.00 acres, more or less. Parcey No. 3. Part of Acquisition Tract No. 10: All that part of section 29, Blk. 2-T, T. & N. O. RR Survey, Lying East of U.S. Highway No. 287, containing 451.18 acres, more or less. Parcel No. 4, 222.07 acres of Acquisition Tract No. 1, being all that part of section 36, Blk. 2-T, T. & N. O. RR Survey, lying East of Texas State Highway No. 9 (same as U.S. Highway No. 287), except 0.38 acre, described as: Beginning at a point in the East R.O.W. line of State Highway No. 9, said point being 2,507 ft. N. of its intersection with the South line of section 36; thence N. 89° 41' E. 550 ft.; thence N. 0° 19' E., 30 ft.; thence S. 89° 41' W. 550 ft. to a point in the East R.O.W. line of said Highway No. 9; thence S. 0° 19' W., a distance of 30 ft. along the East R.O.W. line of Highway No. 9, to the point of beginning. Parcel No. 5. Part of Acquisition Tract No. 2 containing four parcels of land described as: (a) Beginning at a point 106 ft. N. of SE corner of section 37, Blk. 2-T, T. & N. O. RR Survey, thence N. along the East line of said section 37; thence S. 89° 42' W., 1,205 ft.; thence S. 0° 11' E., 848 ft.; thence N. 89° 42' E., 1,205 ft.; to point of beginning, containing 23.50 acres, more or less. (b) Beginning at the NW corner of section 37, Blk. 2-T., T. & N. O. RR Survey, thence S. 0° 14' E., 1,466.66 ft. along the W. line of the said section 37; thence N. 89° 46' E., 891 ft.; thence N. 0° 14' W., 1,466.66 ft. to N. line of said section 37; thence W. 891 ft. along the N. line of said section 37 to point of beginning, containing 30.00 acres, more or less. (c) A tract of land in section 37, Blk. 2-T., T. & N. O. RR Survey, 150 ft. in width being 75 ft. on each side of a center line described as: Beginning at a point 891 ft. E. and S., 0° 14' E., 1,166.66 ft. from the NW corner of section 37, thence S. 38° E., 2,390 ft.; thence N. 83° E., 360 ft.; thence S. 47° E., 1,950 ft. to a point said point being 1,165 ft. W. and 954 ft. N. of the SE corner of said section 37, and containing 15.90 acres, more or less. (d) Beginning at a 1" iron pipe in the West line of section 37, Blk. 2-T., T. & N. O. RR Survey, said point being 105 ft. N. of the SW corner of said section; thence N. along said section 384 ft. to a point in the section line marked by 1" iron pipe; thence S. 44° 20' E., 538.9 ft. to a point in property line fence marked with 1" iron pipe; thence in a Westerly direction 378.1 ft. to point of beginning, and containing 1.66 acres, more or less. Parcel No. 6. Acquisition Tract No. 3: The NW¼ and the S½ of section 38, Blk. 2-T., T. & N. O. RR Survey, except 6.60 acres in the SE corner of the S½ of section 38, lying E. of County Road conveyed to C. R. I. & G. RR Co., by instrument recorded in Vol. 46 at page 59, Deed records of Moore County, Texas, and containing 473.40 acres, more or less. Acquisition Tract No. 4: The NE¼ of section 38, Blk. 2-T., T. & N. O. RR Survey, containing 160.00 acres, more or less. Total 1,538.31 acres more or less. Bids must be submitted on or before 1 p. m., March 8, 1950. Marion Clawson, Director.

ILLINOIS

Fairfield Pool Gets Rosiclare Producer

MATTOON — Fairfield pool in Wayne County is getting Rosiclare production on the west side of the pool. Stewart Oil Co. 3 Osborne, NE SE SW 17-2s-8e, is flowing at the rate of 15 bbl. per hour through 1-in. choke from pay at 3,340-44 ft. Casing was set at 3,380 ft. and current tests are through perforations. A test at 3,360-62 ft. got only water. Total depth is 3,383 ft. Robinson & Puckett 3 Wayne Petroleum Co., SE NE SE of the same section is cleaning out and testing the Aux Vases at 3,248-53 ft. and 3,258-62 ft. after swabbing 20 bbl. per day. To the south, Cities Service Oil Co. 1 E. W. Harris, SW SW SW 20-2s-8e, is drilling below 2,160 ft.

Calvert Drilling Co. et al 1 O. R. Evans, NE SE NE 2-3s-10e, north and west of development in the southern end of Albion Consolidated pool in Edwards County, has been completed for 107 bbl. per day from Biehl sand at 1,963-87 ft. Same operator has set casing at the west offset, 2 Evans, and will test sand at 1,990-97 ft. Well was drilled to 2,021 ft.

In Lawrence County, Messmer Oil Co. 1 Ida Nesbitt, SW NE SW 21-3n-11w, discovery well northeast of Billett townsite, has been completed in the McClosky at 1,890-95 ft. and 1,915-20 ft. with an initial production of 158 bbl. of oil and 10 bbl. of water per day. Illinois Mid-Continent Co. 1 School Trustees, two locations west and about one location south of the discovery well, set casing at 1,860 ft. after a drill-stem test of the McClosky at 1,849-60 ft. recovered 155 ft. of oil, 125 ft. of mud-cut oil and 60 ft. of salty sulfur water. Same operator is pump testing the McClosky at 1 K. McClure, NW corner of Section 28, after swabbing 58 bbl. per day natural.

ILLINOIS SUCCESSFUL WILDCAT

Madison County: George Zecos 1 J. Pepovich, W½ NE SW 28-6n-6w, IP 24 bbl., Pennsylvanian sand, 538-41 ft., TD 543 ft.

ILLINOIS WILDCAT FAILURES

Bond County: Horles Petroleum Co. 1 McCario, SW SW SW 27-7n-4w, dry, TD 800 ft.

Cumberland County: General Oil Development Co. 1 Browns, SE NE SE 1-9n-10e, dry, TD 659 ft.

Edwards County: Miracle and Stebber 1 Luther, SW NW NW 13-1n-10e, dry, TD 3,284 ft.

Effingham County: R. Edwards et al., 1 Smith, SW SE NW 8-8n-4e, dry, TD 1,664 ft.

Jasper County: A. J. Slagter, Jr., 1 Hall, NE SW SE 13-7n-8e, dry, TD 3,082 ft.

Montgomery County: Benoist Brothers 1 C. C. Haworth, NW SW NW 24-7n-4w, dry, TD 925 ft.

St. Clair County: E. A. Shering 1 Gordley, NW NW SE 10-2n-6w, dry, TD 2,511 ft.

CANADIAN FIELDS

Another Gas Discovery For Alberta

CALGARY — Bailey-Spedden No. 1 wildcat, LSD 5, 1-60-13w4th, about 75 miles east-northeast of Edmonton in Central Alberta, has been completed as a Lower Cretaceous natural-gas discovery well, and has been capped pending availability of a market. Testing by gun perforation of casing was recently completed. The Lower Cretaceous sand interval 1,565 to 1,580 ft. was gun-perforated and given an hour test. It gave up gas at a rate of 3,000,000 cu. ft. daily. Also gas bearing on basis of a drill-stem test run before completion of drilling, is the interval 1,604-29 ft. This interval gave gas at rate of 750,000 cu. ft. daily.

Other zones tested by gun perforation gave the following results: 2,062-72 ft., gave up a noncommercial showing of heavy crude oil; interval 2,000-12 ft., gave up a small gas blow. These lower zones have been plugged off, and a top hole plug has been set in the well to preserve it for future use as a gas producer. The Spedden well is backed by Texas Alberta Co., Tower Pete, Calvin Pete, Reef Pete, and the A. G. Bailey Co. & Associates.

Leduc Calmar 2, southeast Leduc extension success, ran production tests and flowed oil at a flush rate of 400 bbl. daily. The well, in LSD 5, 25-49-26w4th, about 1¾ miles southeast of the main Leduc oil field, completed in the D2 zone of Devonian at 5,295 ft. Production string of casing was set and perforations carried out in about 33 ft. of porosity around 5,228-61 ft. A small acid treatment of 500 gal. was applied and the well was swabbed into production.

The well was financed by six Canadian independent oil companies: Leduc Calmar Oils, Ltd., Kroy, Jupiter, Highwood-Sarcee, Alberta Leaseholds and Vulcan Oils. With oil success shown at this first joint venture, possibilities favor the opening up of three wellsites on the team's quarter section, while increased exploratory work in the area by the other groups is expected to result from this important extension.

Two wells, both ¼-mile offsets to production at Excelsior, have set production string of casing preliminary to testing D2 zone of Devonian. The wells are: Imperial-Excelsior 2, LSD 4, 10-56-24w4th, ¼ mile north of the Imperial discovery well and Rio Bravo-Carruther 6-3, LSD 6, 3-56-24w4th, ¼ mile east of Rio Bravo's initial Excelsior oil success. Both wells are indicated oil successes and it is expected that

production testing will commence immediately.

Ten wells were completed in Alberta and one in British Columbia during the past week, boosting total number of completions for this year to 76 in Alberta and 2 in British Columbia. Six of this week's completions were successful oil wells, one gas discovery and four failed to find oil or gas production.

At Redwater, three oil wells were placed on production, two by Imperial Oil, Ltd., raising its total number of producers to 122, and one by Ohio Oil Co., its second producer.

At Leduc-Woodbend, the Home-Anglo-C. & E. team placed 2 more Woodbend oil wells on production from the D3 zone, to give it 15 producers in that field. Leduc Calmar Oils, Ltd., and a team of five other Canadian independents received their initial oil success in the Southeast Leduc extension area. R. W. Development Co. of Calgary failed at its extension effort on the northeast fringe of the Leduc field.

The A. G. Bailey Co. & Associates rated a substantial natural-gas discovery at the Spedden wildcat in Central Alberta. The well, about 75 miles east-northeast of Edmonton, has been capped pending a market for its product.

Leduc Calmar Oils, Ltd., failed to find production at its Excelsior stepout test, while the Major Oils-Omnitrans Oils team also failed at its Taber extension effort.

SUCCESSFUL WILDCAT

Bailey-Spedden 1, LSD 5, 1-60-13w4th, TD, I.P. 3,000,000 cu. ft. daily from Lower Cretaceous interval 1,565-80 ft. Capped as gas well.

UNSUCCESSFUL WILDCATS

Leduc Calmar-Excelsior 1, LSD 12, 15-56-24w4th, dry, TD 4,029 ft.

Major-Omnitrans 1, LSD 13, 9-9-17w4th, dry, TD 3,249 ft.

Royalite-Queen Charlotte 1, 354.1 ft. W, 52.18 ft. S of the SE cor. of Lot 2794, dry, TD 3,512 ft., Graham Island, British Columbia.

Orbit Valve Announces New Representative

LeRoy Mitchell, a manufacturer's representative, who heads Great Western Co., of Casper, Wyo., has recently been appointed to represent Orbit Valve Co. products in Rocky Mountain and Canadian oil fields, according to an announcement by Ed D. Ligon, president of Orbit Valve Co., Tulsa.

Maintaining an office and warehouse in Casper, Great Western serves the industry with production and refining equipment manufactured by W. C. Norris, Manufacturer, Inc., Johnson Block Co., and Orbit Valve Co., all of Tulsa.

Mercer Rubber Co. Will Represent Hose Accessories

Mercer Rubber Co., Houston, has been appointed manufacturer's representative for Texas, Oklahoma, Arkansas, and Louisiana by Hose Accessories Co., Philadelphia, manufacturers of Le-Hi high and low-pressure hose couplings.

Mercer Rubber is well known in Southwest industrial supply circles. The firm is headed by W. H. Sayen III and the Houston office is managed by H. A. Vitriol.

The Le-Hi line includes high and low-pressure hose couplings for pneumatic tools, water and suction hose couplings, gas, oil, and acid hose couplings, as well as couplings for numerous special applications.

Petro-Tech Gets Seisdel Business in Venezuela

Petro-Tech Service Co., Lane-Wells affiliate in Venezuela, has acquired all property and license rights of Seismograph Service Corp. of Delaware in its well logging and shaped-charge perforating business in Venezuela.

Announcement of the purchase was made by Rodney S. Durkee, president of both Lane-Wells and Petro-Tech. Operations in Venezuela are under the direction of Russell W. Keener and Keith H. Miner, vice presidents of Petro-Tech.

Securing the well logging license of Seisdel will enable Petro-Tech to include radioactivity well logging among its services. Plans are already under way to provide additional hoist trucks, instrument cars, and other equipment to extend this logging service, including both gamma ray and neutron curves to all the principal Venezuelan oil fields.

Local management and field employes of Seisdel's logging and perforating divisions have joined the Petro-Tech organization.

Standard Steel Buys Hersey Drying Machinery Division

Standard Steel Corp., of Los Angeles, one of the largest fabricators of heavy steel plate in the west, has announced the outright purchase of the Drying Machinery Division of Hersey Manufacturing Co., of Boston.

Standard Steel has for many years manufactured drying and dehydration equipment for chemicals, fertilizers, and byproducts. In announcing the transaction, Robert S. Burns, president of the purchasing company, stated: "The combination of these two dryer organizations gives Standard Steel a background of engineering, design, and experience in dryer fabrication that is second to none in the country."

Plans for 1950 call for manufacturing in the east as well as in the main plant at Los Angeles, and expansion of sales, service, and plant facilities is under way. Key personnel of the acquired organization will be retained. H. W. Harrigan, general manager of the Hersey Division, will become eastern manager of Standard Steel Corp. J. A. Boyd, chief engineer for Hersey, is moving to Los Angeles to assume a similar position at Standard Steel, assisting Russell J. Love, vice president in charge of engineering.

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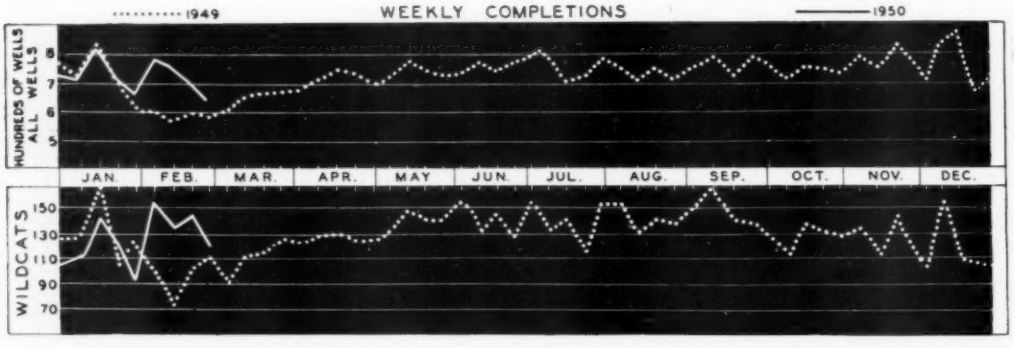
CURRENT STATISTICS

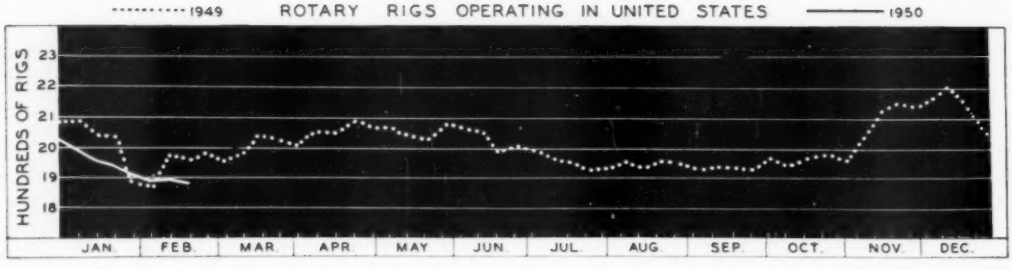
EXPLORATION

WEEKLY WELL COMPLETIONS . . . . WEEK ENDED FEBRUARY 25, 1950

	Total of all wells					Feb. 25		Wildcat completions and discoveries										
													Cumulative total, 1950					
	Comp.	Oil	Gas	Dry	Footage	1950§	1949§	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	6	3	0	*3	9,607	79	250	0	0	0	0	0	0	0	0	0	0
Pennsylvania	20	7	6	†7	32,901	187	418	0	0	0	0	0	0	0	0	0	0
West Virginia	19	10	7	2	35,990	87	80	0	0	0	0	0	0	0	2	2	4
Ohio	19	4	7	8	40,922	143	201	0	0	*	0	0	1	0	0	2	3
Indiana	11	3	0	8	18,348	147	154	0	0	0	0	0	5	0	1	13	19
Kentucky	10	5	0	5	10,376	119	115	1	0	0	1	2	3	0	0	10	13
Illinois	31	14	0	17	64,132	368	354	1	0	0	7	8	5	0	0	82	87
Michigan	18	8	2	8	38,049	99	142	1	0	1	7	9	7	0	1	44	52
Kansas	58	28	5	‡25	189,686	518	454	2	0	0	10	12	13	0	0	73	86
Neb., Mo., Iowa	0	0	0	0	0	9	1	0	0	0	0	0	0	0	0	5	5
Oklahoma	76	48	4	24	260,356	706	522	2	0	1	10	13	24	2	3	88	117
Texas	265	172	8	85	1,211,113	2,166	1,901	5	0	2	46	53	61	5	25	345	436
North Central (Dist. 7-B & 9)	82	39	1	42	262,838	645	563	1	0	0	16	17	20	1	7	109	137
West (Dist. 7-C & 8)	76	67	0	9	429,932	614	401	1	0	0	7	8	16	1	0	79	96
Panhandle (Dist. 10)	15	10	3	2	54,974	173	185	0	0	0	2	2	1	0	2	6	9
Eastern (Dist. 5, 6, & 6-P)	25	19	0	6	76,578	155	170	0	0	0	4	4	2	1	1	35	39
Gulf Coast (Dist. 2 & 3)	41	24	3	14	260,690	304	279	2	0	1	10	13	10	1	4	46	61
Southwest (Dist. 1 & 4)	26	13	1	12	126,101	275	303	1	0	1	7	9	12	1	11	70	94
Louisiana	35	17	5	13	201,827	364	328	0	0	0	3	3	11	4	3	32	50
Northern	16	8	4	4	50,414	193	177	0	0	0	0	0	3	0	0	16	19
Southern	19	9	1	9	151,413	171	151	0	0	0	3	3	8	4	3	16	31
Arkansas	9	5	0	4	30,155	57	33	1	0	0	3	4	1	0	0	18	19
Mississippi	3	0	0	3	20,845	44	54	0	0	0	1	1	1	1	0	13	15
Southeastern States	2	0	1	1	2,496	10	6	0	0	1	1	2	0	0	1	6	7
Montana	2	0	0	2	6,399	20	27	0	0	0	0	0	0	0	0	5	5
Wyoming	13	6	3	4	80,467	100	81	0	0	0	4	4	3	0	0	17	20
Colorado-Utah	0	0	0	0	0	15	19	0	0	0	0	0	0	0	0	12	12
New Mexico	14	9	1	4	80,884	104	90	0	0	0	2	2	5	0	0	10	15
California	33	23	1	9	162,769	287	423	0	0	0	7	7	4	0	1	49	54
Tennessee	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0
Arizona	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Dakotas	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
Total United States	644	362	50	232	2,497,322	5,630	5,666	13	0	5	102	120	144	12	37	827	1,020
Total previous week	701	399	39	263	2,592,678			23	0	5	116	144	131	12	32	725	900
Total February 26, 1949	595	327	21	247	2,217,176			8	2	1	101	112	121	11	22	766	920

Service wells included: *3, †7, ‡1. §Revised.





DAILY AVERAGE PRODUCTION FOR WEEK

	Feb. 25 crude oil	B. of M. Feb. demand	Feb. 18 crude oil
Alabama	1,700	1,200	1,600
Arkansas	80,300	82,000	89,200
California	855,600	832,000	856,400
Colorado	59,650	67,000	61,900
Eastern	59,250	59,900	59,200
Florida	900	1,000	975
Illinois	183,200	180,000	180,500
Indiana	27,600	29,000	27,400
Kansas	287,600	290,000	285,750
Kentucky	25,400	24,000	24,700
Louisiana	545,900	542,000	545,950
North Louisiana	120,000		120,050
South Louisiana	425,900		425,900
Michigan	43,700	45,000	44,800
Mississippi	97,450	99,000	98,150
Montana	23,500	25,000	23,500
Nebraska	1,750	700	1,650
New Mexico	130,800	130,000	130,800
Oklahoma	425,050	415,000	425,700
Texas	1,916,500	2,170,000	1,916,500
Dist. 1 (Southwest)	25,625		25,625
Dist. 2 (Southwest)	110,575		110,575
Dist. 4 (Southwest)	178,800		178,800
Dist. 3 (Gulf Coast)	361,625		364,625
Dist. 5 (Eastern)	32,000		32,000
Dist. 6 (Eastern)	80,800		80,800
East Texas field	211,800		211,800
Dist. 7-C (West)	46,500		46,900
Dist. 8 (West)	582,475		582,475
Dist. 7-B (W. Central)	62,000		62,000
Dist. 9 (N. Central)	128,900		128,900
Dist. 10 (Panhandle)	89,000		83,000
Utah	2,500	1,200	2,500
Wyoming	141,000	126,000	135,100
Total United States	*4,919,350	5,150,000	4,913,575
Change from previous week, up	5,675		
Canada	67,810		63,260
Total U. S. production January 1-February 25			†277,902,240 bbl.
Same period last year (crude plus cond.)			306,945,665 bbl.

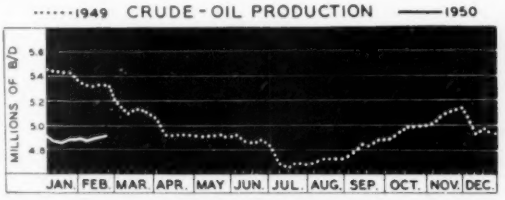
*Not incl. 93,335 bbl. condensate. †Incl. 5,156,550 bbl. condensate.

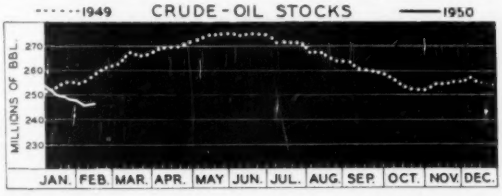
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

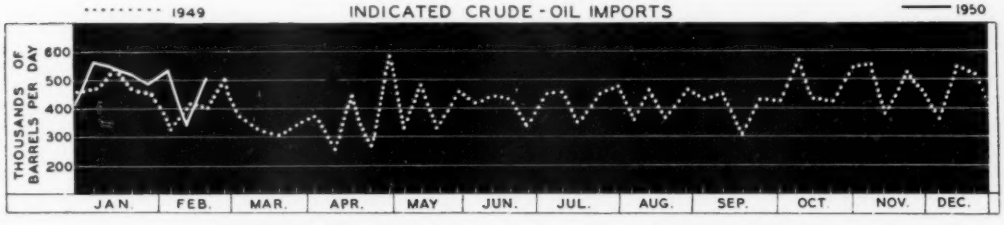
(Thousands of barrels)

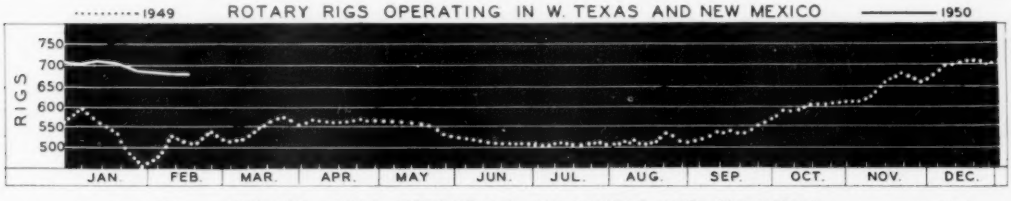
	Feb. 18, 1950	Feb. 11, 1950	Feb. 19, 1949
Pennsylvania Grade	2,762	2,772	2,843
Other Appalachian	1,764	1,706	1,509
Illinois, Indiana, Michigan	11,306	11,434	13,646
Arkansas	3,176	3,048	3,170
Louisiana	14,968	14,692	12,461
North	3,799	3,651	3,291
Gulf	11,169	11,041	9,170
Mississippi	2,648	2,569	2,873
New Mexico	7,308	7,204	6,989
Oklahoma and Kansas	35,269	35,430	36,752
Texas	108,074	109,442	124,377
East Texas	14,245	14,779	15,555
West Texas	38,600	38,149	50,297
Texas Gulf	28,605	29,800	29,976
Other Texas	26,624	26,714	28,549
Rocky Mountain	13,467	13,169	12,558
California	37,767	37,292	33,369
Foreign	7,285	6,692	9,006
Total United States	245,894	245,450	259,553

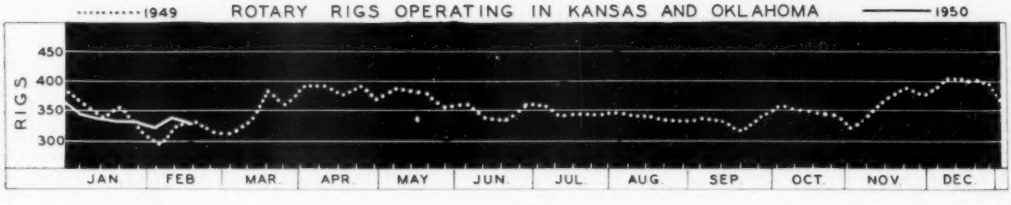
*Bureau of Mines.











A.P.I. REFINERY REPORT, FEBRUARY 18

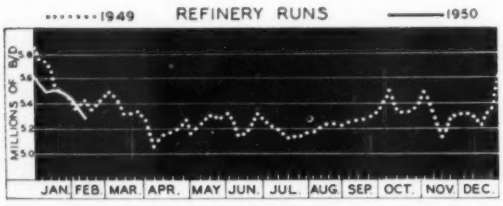
(Thousands of barrels)

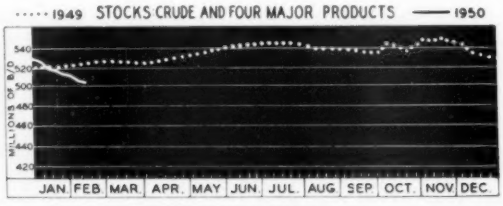
District	Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline†	Kerosine	Distillate	Residual
East Coast	777	350.1	47.4	142.0	183.1	27,135	8,442	20,476	9,938
Appalachian:									
District 1	86	42.1	7.0	12.1	11.4	2,826	358	559	270
District 2	60	25.3	3.3	9.0	10.3	1,074	103	176	140
Ind., Ill., Ky.	953	467.7	68.7	160.9	165.6	27,207	2,776	3,408	3,047
Okla., Kans., Mo.	459	262.0	30.0	95.7	69.7	13,885	609	3,196	871
Inland Texas	188	137.3	10.2	22.1	40.0	4,286	282	623	531
Texas Gulf Coast	1,238	584.3	109.3	227.4	218.9	19,365	2,097	10,248	5,949
La. Gulf Coast	443	188.6	53.3	101.6	47.0	6,899	1,260	3,126	2,084
N. La. and Ark.	82	25.9	7.6	11.3	14.0	3,541	227	460	292
Rocky Mountain:									
New Mexico	13	6.6		1.9	2.9	96	25	76	33
Other Rocky Mtn.	181	81.8	4.7	35.7	36.7	4,663	194	1,390	497
California	798	345.7	1.1	164.6	308.7	20,670	743	10,352	27,684
February 18, 1950	5,278	2,516.7	342.6	984.3	1,108.3	131,647	17,116	58,090	51,336
February 11, 1950	5,362	2,555.3	332.4	963.0	1,241.9	129,362	17,120	60,602	52,865
February 19, 1949	5,369	2,426.3	312.7	1,024.0	1,218.6	122,533	19,929	54,695	59,693

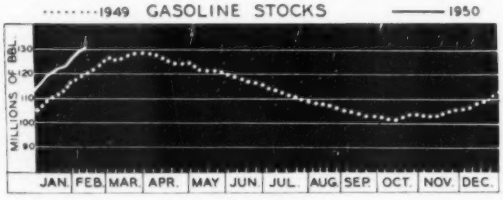
Bureau of Mines, February 1949

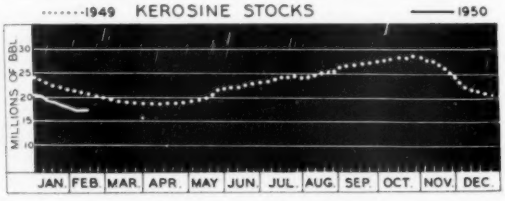
	Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual
	801	319.6	34.9	162.5	209.2

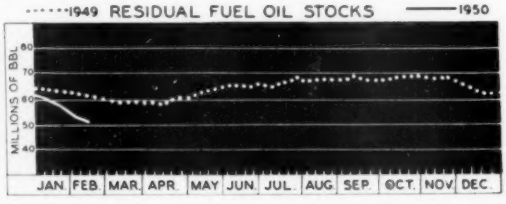
*At refineries including natural blended. †Finished and unfinished.

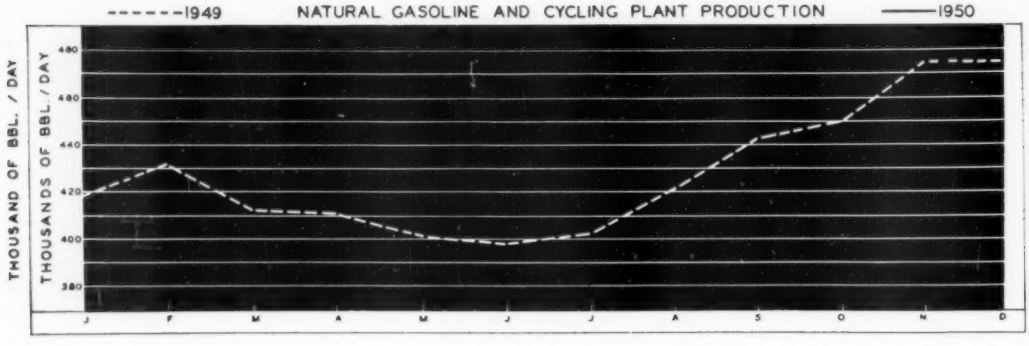












CRUDE PRICES
GRAVITY SCHEDULE

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.53			
19-19.9	1.63			
20-20.9	1.73	$2.25		$2.12
21-21.9	1.82	2.27		2.14
22-22.9	1.92	2.29		2.16
23-23.9	2.02	2.31		2.18
24-24.9	2.12	2.33	$2.56	2.20
25-25.9	2.22	2.35	2.58	2.22
26-26.9	2.31	2.37	2.60	2.24
27-27.9	2.37	2.39	2.62	2.26
28-28.9	2.42	2.41	2.64	2.28
29-29.9	2.48	2.43	2.66	2.30
30-30.9	2.54	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.64	2.49	2.72	2.36
33-33.9		2.51	2.74	2.38
34-34.9		2.53	2.76	2.40
35-35.9		2.55	2.78	2.42
36-36.9		2.57	2.80	2.44
37-37.9		2.59	2.82	2.46
38-38.9		2.61	2.84	2.48
39-39.9		2.63	2.86	2.50
40 and above		2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. Above changes do not include recent reductions of a few buyers applying principally to low-gravity grades.

FLAT CRUDE PRICES

Representative posted schedules per barrel

East Texas†	$2.65
Kettleman Hills, California*	2.77
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	3.54
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

NATURAL gasoline took its third price cut in 3 weeks, bringing Group 3 posting for Grade 26-70 down to 4½ cents a gallon and the North Texas price for the same grade down to 4 cents. These are the lowest prices since 1946. In that year, Group 3 price dropped from 4½ cents to 3¾ cents in the first 2 months of the year then climbed back to 4½ cents by the end of August. This was the beginning of an upward price trend, culminating in a price of 8½ cents for all of the year 1948.

However, the current weakness in natural has brought a decided change in the motor fuel-natural gasoline price relationship. During the period of the 1946 price dip, natural prices were only about 2½ cents below the Group 3 prices for regular gasoline. During the period of higher prices in 1948, the difference was only 2 cents a gallon. Today, the Group 3 price for Grade 26-70 natural is 4⅞ cents under the "low" for Group 3 regular gasoline, the greatest difference on record.

The wide spread between natural and finished gasoline prices will tend to encourage increased production of finished motor fuel at natural-gasoline and cycling plants. These gasolines, though marketed at prices well below refinery-produced gasoline, have not followed the sharp declines of the natural market, and increased production will bring additional competition in the gasoline market.

Colder weather along the Atlantic Coast has brought a firmer tone to the New York Harbor light fuel market. Barge price for No. 2 fuel remains at 7.6 cents a gallon but fewer distress sales are reported. Light fuel trading has been brisk but some operators feel that it would take a longer-than-expected period of cold weather to improve distillate prices this late in the season.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of February 27, 1950. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Tex. Gulf Coast
Regular gasoline, 74-76 octane	9⅜-9¾	10.5-10.6	9-9⅜
Premium gasoline, 78-80 octane	10⅜-10¾	11.5-11.6	9¾-10¾
42-44 w.w. kerosine	8½-8¾	8.8-9.1	8-8½
No. 2 straw fuel oil	7⅝-7⅞	7.6	6¾-7
No. 6 residual	$1.45-1.55	$2.05	$1.65-1.75

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	4½	4	4¼
Grade 18-55	5.4	4.9	5.15

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	10.5
750 vis., No. 3-4 neutral	12.75
2,000 No. 5-6 neutral	14-14.5

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	17
200 vis., No. 3 neutral, 0-10 pp.	11.5-13

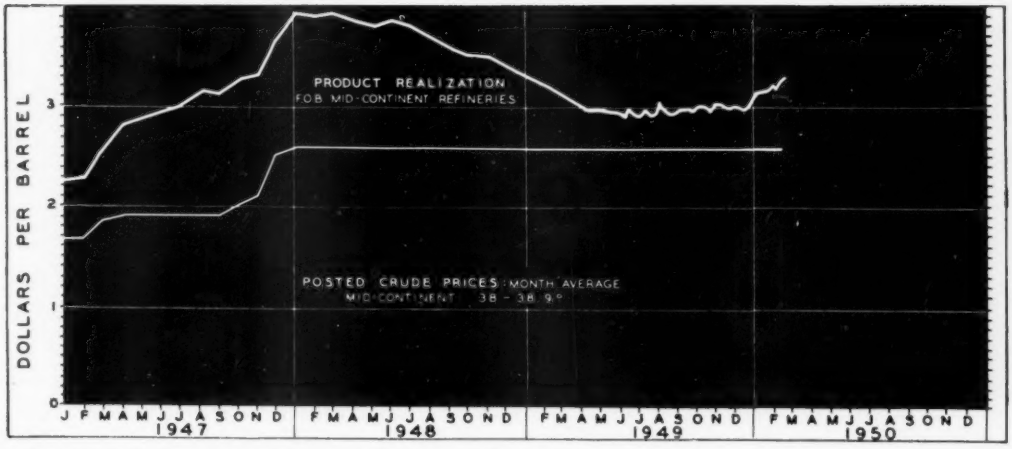
Western Pennsylvania

145-155 vis., 10 p.t. bright stock	19.5-20.5
180 vis., 0 p.t. neutral	20.5-21.5

WAX

Mid-Continent

132-134 A.M.P.	4.25


DOLLARS PER BARREL
PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
POSTED CRUDE PRICES: MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
0
1
2
3
J F M A M J J A S O N D
1947
F M A M J J A S O N D
1948
F M A M J J A S O N D
1949
F M A M J J A S O N D
1950

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil

Here's the RIGHT FORMULA for choosing STEAM TRAPS

Be sure you use the right formula in figuring its cost when you choose a steam trap. *Purchase price alone never gives a true cost picture.* Figure the installed cost (adding installation and maintenance costs) and you've an honest picture of steam trap costs.

Super-Silvertop Steam Traps always assure lower ultimate cost. The conventional trap requires costly fitting and labor to get it installed, while Super-Silvertops fit snugly as a pipe union or elbow . . . saving up to nine fittings plus sixty minutes of installation time. In addition, Super-Silvertops save forty-five minutes whenever you replace a part or clean. Use the right formula in figuring trap costs, and you'll choose Super-Silvertops every time. Write for free copy of "Solving Steam Trap Problems" which gives further information on cutting steam trap costs.

RIGHT FORMULA

X=PURCHASE PRICE OF TRAP
Y=COST OF INSTALLING TRAP
Z=COST OF MAINTAINING TRAP
X+Y+Z=TOTAL EXPENSE

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EQUIPMENT MEN . . . in the News

Bovaird Announces Several New Personnel Changes

J. R. KENNEDY

R. W. ROBBINS

With the opening of three new stores, at Ringwood, Okla.; Snyder, Tex.; and Great Bend, Kans., Bovaird Supply Co. has also announced a number of important personnel changes, according to R. E. Batchelor, general manager of Bovaird stores.

In Texas, J. R. Kennedy, store manager at Odessa, is now West Texas district manager at Odessa; E. W. Nolan has been promoted from assistant to store manager at Odessa; Lyle Galbraith, Odessa field salesman, has been appointed store manager at Snyder; Walter W. Cook, Borger, and Bill Barnett and Aldon Shirey, both new employes, are now located at the Snyder store.

In Kansas, R. W. Robbins, assistant district manager, has been appointed district manager of Kansas, stationed at Great Bend; J. E. Goodell, field salesman at Chase, is now store manager at Great Bend; John King of Chase, and Robert Scott of Russell, have been transferred to Great Bend. F. H. Rudrauff, of Clay City, Ill., has been transferred as field salesman at Great Bend.

In Oklahoma, Paul Brown, field salesman at Oklahoma City, has been made store manager at Ringwood; R. B. Reeves, Duncan, and Roy Teagarden, Oklahoma City, were transferred to Ringwood, and Leon Short, a new employe, is at the Oklahoma City store.

General Controls Opens Branch in Newark, N. J.

J. F. Ray, vice president in charge of sales, General Controls, Glendale, Calif., manufacturers of automatic pressure, temperature level, and flow controls, has announced the opening of the company's twenty-second branch office at Newark, N. J.

The new office will include extensive warehouse facilities where a complete line of controls will be stocked to more efficiently serve General Controls customers on the Eastern Seaboard.

William Buck, formerly sales engineer for the firm's Philadelphia branch, has been named as Newark branch manager.

Other General Controls organizational changes include the appointment of R. M. Korty as branch manager in St. Louis; the addition of Robert L. Day to the sales engineering staff in San Francisco; and the appointment of Rudolph J. Roedder, sales engineer, as refrigeration specialist in the Los Angeles sales office.

Rippie Leaves Lukens to Join American Development

Dr. Charles W. Rippie has resigned his connection with the sales department staff of the Lukens Steel Co., New York City, and is now vice president and technical director of American Development Corp., New York City.

Dr. Rippie for several years was research chemist and later assistant to the vice president of the manufacturing division of Shell Oil Co.

Record Size Rock Bit Used To Repair California Wells

Terminal Drilling Co., engaged in repairing several earthquake-damaged wells for Union Pacific in California fields, has used this gigantic 8-2C rock bit, manufactured by Globe Oil Tools Co., Los Nietos, Calif. The bit has just been pulled after opening 1,831 ft. of 17 to 26 in. during which time it drilled as fast as 100 ft. per hour.

Barnard, Goehrig Make Mexico Trip for Goodall

H. "Barney" Barnard, president of Goodall Rubber Co., of Texas, and R. J. Goehrig, vice president and general manager of the Goodall-Whitehead Cos., Trenton, N. J., have left Houston for a 2-week trip to Mexico.

During his trip to the Southwest, Goehrig will also make inspection trips to various oil fields in the area.

United Supply Names Executives to New Posts

JACK SCHWARTZ

BEN REAGOR

Jack P. Schwartz has been appointed head of the new machinery sales division of United Supply & Manufacturing Co., and Ben Reagor as Louisiana district manager, according to H. B. Gutelius, president of the firm.

Schwartz comes to United from Loffland Brothers Drilling Co., where he was equipment engineer. United's new machinery sales division will handle heavy drilling equipment, including draw works, pumps, engines, blocks, tables, and swivels.

Schwartz has been associated with oil-field heavy equipment since 1933 when he was with Waukesha Motor Co. He was assistant to the factory branch manager when he went to Mid-Continent Supply Co. as installation engineer on all drilling equipment.

Reagor, formerly North Louisiana field representative for United, started in the oil-field supply business 15 years ago with Superior Iron Works & Supply Co. He joined United as field representative in 1948. His headquarters will be in Shreveport.

Triad Names Three New Agents for Geoformers

Having completed a 3-week tour of the Mid-Continent and Texas oil countries, Ernest Clover, head of the geophysical division of Triad Transformer Manufacturing Co., Los Angeles, has announced the appointment

of three new distributors. They are: Radio, Inc., Tulsa; Wilkinson Bros., Dallas; and A. R. Beyer Co., Houston.

On this trip, Clover introduced Triad's geophysical transformers, known to the trade as "Geoformers." In particular Clover noted that those responsible for the design and redesign of Geophysical survey equipment are interested in smaller, lighter components.

A-1 Bit & Tool Moves Pratt To Corpus Christi District

A. J. PRATT

A. J. (Jack) Pratt has been appointed Corpus Christi district manager for A-1 Bit & Tool Co., of Houston. He succeeds the late R. L. Agee, who held this position until his recent death.

Pratt, who was graduated from University of Texas in petroleum engineering, has acquired valuable drilling experience, serving as roughneck and driller both in this country and abroad. He began work for A-1 in 1946 in the Corpus Christi district as sidewall core-barrel and casing milling operator. His broad knowledge of Gulf Coast drilling problems and conditions makes him especially valuable in his new capacity.

Fluor Corp. Is Adding Modern Engineering Plant

As part of the Los Angeles main-plant expansion program, Fluor Corp., Ltd., has started work on a new engineering building, J. S. Fluor, Jr., executive vice president, has disclosed. The two-story air-conditioned building will have 9,200 sq. ft. of floor space, including a full basement, and will be constructed of precast reinforced concrete.

Basement facilities will provide a mailing room, specification room, and a printing room with adequate space for three blueprint machines. The print machines will handle all blueprints for engineering and drafting. First floor plans call for two drafting rooms with space for 30 men each, and 17 offices for project engineers. The second floor will provide three drafting rooms, accommodating 30 men each, and eight offices for project engineers. A conference room will also be located on the second floor.

Lorain Hoes In Use on Mississippi River Gas Line

Two wide-gage Lorain TL hoes work back to back on the 57-mile Poplar Bluff, Mo., loop of Mississippi River Fuel Co.'s 24-in. natural-gas line. Mary Construction Co., Cape Girardeau, Mo., is the contractor.

Dowell Promotes Talbot to District Sales Engineer

J. S. TALBOT

John S. (Jack) Talbot, development engineer for Dowell Incorporated in Alice, Tex., has been promoted to district sales engineer and transferred to the Houston area district office, according to an announcement by Ralph H. Smith, district manager at Houston.

Tom J. Tighe, service engineer at Houma, La., has been promoted to sales engineer at Victoria, Tex., and Joe P. Moran, Victoria sales engineer, has been transferred to Alice, Smith said.

Talbot, a Universtiy of Oklahoma graduate in petroleum engineering, went to Alice in 1947 as development engineer. He came with Dowell in 1946, being transferred to the Houston district from Cleveland. Before coming to Dowell, Talbot was associated with Champion Refining Co., at Enid, Okla.

Tighe, a graduate of Texas A. & M. College, started with Dowell as a service engineer in Lafayette, La., in 1948.

Moran has been in Victoria since January 1949, having transferred there from Grayville, Ill. He went to Grayville from El Reno, Okla., in 1947. He received a bachelor of engineering degree in mining at Ohio State University.

Bethlehem Supply Co. Holds Two-Day Sales Meeting

Resident managers, district manager, and production engineering representatives of Bethlehem Supply Co., who attended a January sales meeting in Tulsa are: front row, Fred Parks, J. C. Knoll, C. E. Medley, H. R. Klein, M. R. Griffith, E. S. Lewis, H. A. Wilson, P. H. Jezzard, Jr., R. A. Johnson, J. V. Spalding, and W. T. Davis. Second row: W. E. Stephenson, J. F. Eaton, F. R. House, V. W. Bailey, C. C. Crider, G. A. Tompson, C. R. Zimmerman, I. C. Smith, H. R. Powers, J. T. McKenna, N. G. Blankenship, W. J. Brady, and R. E. Dow. Third row: H. E. Davidson, R. F. Arbs, F. S. Rudrow, N. D. Lee, J. G. Floyd, D. G. Rhoads, J. K. Davis, H. S. Sutton, T. C. Graham, F. C. Batson, D. H. Geary, H. V. Harder, R. E. Garlington, Jr., Arthur Weber, Jr., C. R. McNair, Jr., G. L. Reid, Guy Brown, Jr., W. A. LaRew, and R. L. Neal. Back row: L. J. Nelson, H. A. Barnes, A. T. Padavic, G. B. Sager, C. W. Henry, D. C. Thomas, R. A. Day, Joe Chastain, O. H. Crowe, T. B. Simpson, R. W. Neal, Christian Seger, Jr., L. A. Myers, and T. W. Thurmond, Jr. H. L. Hawkinson, Jr., from Houston, and W. F. Taylor of Tulsa also attended but are not in the picture.

Webster Speaks to Nomads

S. W. Webster, of Emsco Derrick & Equipment Co., was the principal speaker at the regular luncheon of the Tulsa Nomads, February 17. He highlighted his recent trip to South America and also presented movies.

Bettis Forms Rubber Products Division

T. M. SMITH

Rubber Products Division of Bettis Corp., Houston, has been formed for the purpose of producing and distributing Trojan drill-pipe protectors. T. M. "Tommie" Smith, Jr., formerly with Patterson - Ballagh, has been appointed manager of the division.

In making the announcement, J. M. Sheesley, president of Bettis, said that Trojan protectors have been tested extensively in West Coast fields during the past 12 years. Available in natural rubber or special oil-resistant materials, they are installed by a patented hydraulic applicator.

Also joining the Rubber Products Division is Tony Bilbo, former agent for Bettis Rubber Co., of California. Bilbo will be stationed in New Iberia, La., and will be the company rubber-products division representative in Louisiana and Mississippi.

Forsythe, Curran Get Schlumberger Promotions

R. L. Forsythe and A. H. Curran, Jr., have recently received promotions into key positions in Schlumberger Well Surveying Corp., R. Henquet, executive vice president announced recently.

G. J. Decker, district manager for Schlumberger at Hobbs, N. M., is moving to Edmonton, Canada, on a special assignment, according to A. Morazzani, Permian basin division manager.

Forsythe, formerly district manager for Schlumberger at Long Beach, Calif., has been transferred to the company's Canadian office in Calgary and has been promoted to assistant area manager. He joined the firm in 1937.

Curran, senior field engineer for the Long Beach district, has been promoted to Long Beach district manager, replacing Forsythe. He joined Schlumberger in 1945 as engineer in the Bakersfield office, and was transferred to Long Beach a year ago.

Decker will remain in Canada for several months and then will return to another assignment in the United States.

W. D. Staley Named Sales Manager for Duriron Co.

Wayne D. Staley, formerly New York district manager for Duriron Co., Inc., has been appointed general sales manager and will be located at the home office of the company in Dayton, Ohio.

Guy A. Baker has been appointed vice president in charge of manufacturing for the Duriron. For several years Baker has been assistant to the president and secretary of the company. Prior to that he had been manager of the Duriron company's alloy castings sales.

In directing sales and advertising activities Staley will replace D. E. Jack, who has resigned as vice president in charge of engineering and sales. R. F. Sharpe, former manager of the Philadelphia office, has been appointed New York district manager. Ralph L. Watts, who was formerly sales engineer in New York, will be in charge of the Philadelphia office.

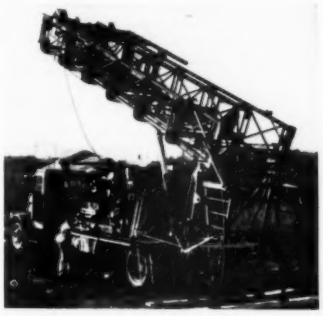
Briton Delivers Its First Oil-Well Servicing Unit

The first high-capacity, truck mounted oil-well servicing unit to be designed and manufactured in the United Kingdom, left the Port of London last month for Cabimas, near Lake Maracaibo, in northwestern Venezuela.

The unit is one of 10 ordered by Shell Petroleum Co., Ltd., for use in widely scattered oil fields. Three more will go to Venezuela and the remainder are destined for Indonesia, Trinidad, and Egypt.

The unit, complete with mast, weighs about 25 tons. It was designed and manufactured by Woodfield Hoist Co., of Rochester, Kent, England. It comprises either a double or single-drum diesel hoist with 64-ft. telescoping, tubular-steel mast of 60,000-lb. capacity, mounted on a Leyland Super Hippo truck. Over-all height is 13 ft. 9 in. when mast is horizontal. The truck, built by Leyland Motors, Ltd., is equipped with a five-man cab for the crew.

Both truck and hoist are fitted with Leyland 125-hp. engines. Power is transmitted from hoist engine to hoist through a hydraulic torque converter. Also fitted are air clutches, air brakes, and air engine starter. The mast for the unit is produced by Stewarts & Lloyds, Ltd.



One of 10 oil-well servicing hoists manufactured in the United Kingdom. Four of these units are destined to serve Shell Petroleum Co., Ltd., in Venezuela

Turner and Thomson Join Western Supply Sales Staff

Frank Turner and Dale M. Thomson have joined the sales staff of Western Co., acidizing and perforating firm with headquarters in Midland, Tex., John E. Cooper, sales manager has announced.

Turner was manager of Western's Odessa station when moved to the sales department and has been with Western since 1945. Before the war, he was a salesman for 7 years with Rector Well Equipment Co. in North Texas and Oklahoma. He has also worked with Davidson Drilling Co. and Loffland Brothers Drilling Co. in West Texas, and was in the drilling department of Stanolind Oil & Gas Co.

Thomson started his career in the land department of Phillips Petroleum Co. in Tulsa and later was engaged in oil-well acidizing and cementing for 10 years with the industrial service division of Dowell Incorporated in the Mid-Continent area. He was in the drilling contracting business in that area before becoming one of Western's salesmen.

Rockwell Names Gilmore, Hurley to New Posts

E. R. GILMORE

H. L. HURLEY

L. A. Dixon, vice president of Rockwell Manufacturing Co., has announced the appointment of E. R. Gilmore as chief engineer of the company's Macnick Division at Tulsa, and C. K. Madison, Houston district manager for Rockwell, has announced that H. L. Hurley will handle all major oil and engineering company accounts in the Houston district, replacing J. W. Northcutt, who was recently appointed Atlanta district sales manager.

After graduating from Rensselaer Polytechnic Institute in 1920, Gilmore joined Cities Service Co. in Bartlesville, Okla., as a junior engineer. In 1936 he joined Pittsburgh Equitable Meter Division of Rockwell as a project engineer. Subsequently he was plant engineer, then chief engineer, supervising the development of all gas, gasoline, and oil products.

Hurley has been with Rockwell since 1943 as sales and service representative for valves and gas equipment in Southwest Texas. Prior to joining Rockwell he served as pipe superintendent for Arthur G. McKee Co.

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ROLAGRIP COUPLINGS—For Sale, Approximately 40 tons, $1^1/_2$" to $3^1/_2$" Line Pipe Size. New, never used, complete with nuts, bolts and neoprene gaskets. Price 50% less than manufacturers selling price. Send for list. JULIUS M. FOGELMAN, Reading, Pa.

FOR SALE: 1—36-L Bucyrus Rig, 1948 model, complete with all tools. Phone 2032, Henderson, Kentucky.

FOR SALE: One Wilson Mogul Double Drum rig, complete with 98' L. C. Moore derrick and 14" Bethlehem pump. In excellent repair, drilling capacity 6,000'. Will sell with or without 4,000' $3^1/_2$" modified drill pipe. Priced for immediate delivery $52,000.00, subject to prior sale. Mack Well Servicing Company, P. O. Box 29, Alice, Texas.

CATERPILLAR D-17000 ENGINES

Two complete skid mounted units used less than 30 days. V-Belt equipped.

Box D-405

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

NEW STEEL PIPE

(Available Immediate Delivery)

36,000 ft. 16" O.D. x $^3/_8$" wall, 52.85 lb.
4,500 ft. $12^3/_4$" O.D. .330 wall, 43.77 lb.
17,000 ft. $10^3/_4$" O.D. x $^1/_4$" wall, 34.83 lb.

All longitudinal seam, electric continuous weld, mild weldable quality, 20 ft. single random lengths. App. 80° beveled for welding, balance plain square cut ends. Priced attractively for prompt shipment from Fresno, Calif.

MID-STATES PIPE & SUPPLY CO.
Ph. 2-9128 Tulsa, Okla.

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SEAMLESS TUBING

21,000 ft. $5^1/_2$" OD
55,000 ft. 4" OD
75,000 ft. $3^1/_4$" OD
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120,000 ft. 2" OD
95,000 ft. $1^1/_2$" OD
Single or double random lengths

Also New 4" OD Seamless

BOILER TUBES

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20-22 Random lengths, plain ends, beveled for welding.

Write—Wire—Phone

SONKEN-GALAMBA CORPORATION
2nd and Riverview (X-554)
Kansas City 18, Kansas THatcher 9243

EQUIPMENT FOR SALE

FOR SALE: Two steel mud tanks, 5 feet by 8 feet; 30 feet long, made of $^1/_4$" steel, sloping bottom. Never been used. $3200. Located Makin Drilling Company's yard, Hobbs, New Mexico.

ONE Skid mounted 5 x 10 Gardner Denver Pump with 325 Buda Engine used to drill five shallow holes—$3000.00. Riverside-6811, Dallas, Texas.

FOR SALE: One Star A-83 Speedster in excellent condition. For information, call Carl A. Lesh, Hart, Michigan, or D. B. Lesh Drilling Company, St. Elmo, Illinois.

USED ROTARY AND CABLE TOOL DRILLING TOOLS, WIRE LINES. E. A. KELLY, BOX 861, OKLAHOMA CITY, PHONE 5-6407.

FOR SALE—Kobe triplex power unit Ser. No. 3200-001, size 2-B-2RG, direct driven, mounted on power base. Flexible engine coupling, booster pump and drive, single chemical feed, chemical tank and drive, engine beds, guards, and miscellaneous piping. ALSO, 1 Kobe triplex power unit Ser. No. 3300-111. Same as above. Both practically new and in good shape. Can be seen on lease west of Okemah, Oklahoma. For information phone 2-8095, Tulsa.

FOR SALE

100 KW. Generator Set—General Motors Series 71—Twin 6 Motors—with 100 KW. Generator—complete with exciter, voltage regulator, etc. Run 200 hours since complete overhaul. Also Caterpillar D-8800 Power Unit completely rebuilt.

MARTIN TRACTOR CO.
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VALVES

7—6" Merco-Nordstrom Plug Valves, Fig. No. 18849 (3049). Each	$330.00
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All above in good condition.

Location: Alice, Texas
Purchasing Department

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Railroad Tank Car Tanks, 6,500 to 12,000 Gal. Cap. Coiled and Non-Coiled

Cleaned—Painted—Tested
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Other Tanks, Too.

Also — Complete Tank Cars 8,000 and 10,000-Gal. Cap.

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EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

SEISMOGRAPH EQUIPMENT FOR SALE: Two 2-Ton Chevrolet Coleman 4-Wheel Drive water trucks, 500 gallon tank completely winterized, vacuum fill, Tulsa winch, etc. Excellent condition, low mileage. Original Cost $8600.00—Sale Price $4000.00.

One $^1/_2$-Ton Chevrolet crew and field service unit. Bed enclosed with steel, cab with heater, 65 gallon gas tank with gear pump, 7.50 x 15 tires. Low mileage. Original Cost $2800.00—Sale Price $1800.00. Riverside-6811, Dallas, Texas.

ONE 24" drilling bit with 4" x 5" pin; one 20" casing spider with 20" x 20" slips; one 20" Dunn elevator. Creston Supply Company, 725 Wright Bldg., Tulsa, Oklahoma. Phone 4-6082.

FOR SALE: Used Cooper Skid Model F well servicing unit, mounted on 6X6 GMC with new motor and good rubber. With or without 8 X 10 X 60 ft. mast and tools. Unit located at Seminole, Okla., Box D-388. The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Approximately 15,000 feet of 6" OD "Invasion" Steel Pipe, Wt. about 9#, $6^5/_8$" OD Plain Ends, 20' lengths. New condition. Also, approximately 15,000 feet of $6^5/_8$" OD Plain End Stand Black Steel Pipe, No. 2 Grade. M. KAPLAN & SON, Box 1883, Phone 942, Monroe, Louisiana.

NEW $5^1/_2$" O.D. CASING COUPLINGS

Seamless, A.P.I. J-55 Specs., 8 round thread, $6^3/_4$" lengths for 14# and 15.5# casing. 1000 available immediate delivery $2.00 each, subject prior sale.

MID-STATES PIPE & SUPPLY CO.
Ph. 2-9128 Tulsa, Okla.

COMBINED VAPOR SEPARATOR & FRACTIONATOR FOR THERMAL REFORMING

One—New 5'-6" ID x 61'-0" over-all height Bubble Tower made of $1^1/_4$" Plate and lined throughout with 3-64" and 7-64" thick, 11-13% Chrome stainless steel, type 405. Stainless steel support plates in place for 15 Trays (Trays not included). Constructed in accordance with the API-ASME Code, stress relieved and radiographed. Designed for 400 PSI at 750° F. Fabricated by A. O. Smith Corporation. Platform and ladder clips installed.

FRACTIONATING TOWER

One—New fractionating tower, 5'-0" I.D. x 89'-6" over-all height x $1^1/_8$" plate. Thirty-four bubble trays, ten 18" 300# manways. Stress relieved and built in accordance with API-ASME Code for 350 PSI working pressure.

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Immediate delivery from storage, all new materials costing $2,000,000 for completely engineered unit. All drawings available.

Designed for Standard-Vacuum Petroleum Maatschappij to run 35,000 to 45,000 B/D of Sumatra Crude. Can be adapted to run sour crudes.

Any offer submitted before March 15, 1950 will be considered.

For complete information, telephone or telegraph:

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Standard Oil Development Company
P. O. Box 121, Linden, New Jersey
Telephone: Elizabeth 2-3900

EQUIPMENT FOR SALE

FOR SALE: Failing 3600 well drilling machine mounted on 1946 Dodge 1½ ton truck. Drilled less than 1500 ft. 150 ft. drillstem, 4 Hughes rock bits, 4 fishtail bits, mud bucket, complete for well drilling. Must be seen to appreciate price. W. W. Howell, Calera, Alabama.

FLAT MILD STEEL PLATE

200 pcs. 5/16" x 60" x 180"
150 pcs. 3/8" x 60" x 180"
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150 pcs. 1/2" x 60" x 180"

Above tank plates available dismantled 55,000 bbl. tanks, used first-class condition. Priced low for quick delivery from Tulsa and Oklahoma City.

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For Sale

Reconditioned New Mill Reject Seamless plain end pipe:

3500 ft. 10¾" OD x 40 lbs.
570 ft. 12¾" OD x 45 lbs.
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Attractive prices.

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FOR SALE: 1—Cardwell K Double Drum Unit unitized with GAK Waukesha. 1—7¼-x 18 Model 7P Wilson-Snyder Pump. 1—7¼ x 12 Clark Triplex Pump. 1—7¼ x 10 Model EE-PXD Gardner-Denver Pump. 1—4 x 6 Fig. 6161-A Fairbanks-Morse Pump. 1—1⅜ x 3 Union Triplex Glycol Pump. 2—D13000 Caterpillar Diesel Engines. 2—PA100 International Engines. 1—7⅝ x 8¾ Hughes Type J Core Barrel. 1—A250 Bethlehem Crown Block. 1—Deckard Monkey Board for 136'-30' Base Derrick. 1—Hunt Tool Monkey Board for 125'-24' Base Derrick. 1—13⅝ SDA Cameron Blowout Preventer c/w 13⅜ Pressure Operated Gate Valve. 1—Set (2) 7¾" wide x 10' high x 21' long Substructure c/w walkways, handrails, and steps. 1—Type B-6 Emsco Swivel. 10—5¼" OD x 30' Drill Collars in tandem of 5 each. 1—24" x 48" Link Belt Mud Screen c/w Model AEH Wisconsin Motor.

All equipment completely overhauled.
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MUD Hog Pump 7¼ x 12 Gardner-Denver, and other drilling equipment. See at Garrett Equipment Co., Wichita Falls. Make an offer to D. F. MacKinnon, 3200 Main Street, Dallas, Texas, Phone C-6415.

ONE Set 12" x 52 ft. National Shear Poles, complete with traveling block, casing line and guy lines. Everitt-Whiting, Inc., 725 Wright Bldg., Tulsa. Phone 4-6082, Tulsa, or 750, Okemah, Okla.

WAR SURPLUS MACHINERY

Gaso, Byron Jackson, Aurora, Wayne, Lombard, & Hale Fire Pumps with Engines, 1½ to 25 KW Generator Sets or Light Plants, Engines, Suction Hose, Fire Hose, Victaulic Couplings & Etc. Write for listing. H. A. McCarthy, 310 Thompson Bldg., Phone 5-3296, Tulsa, Oklahoma.

MODEL KS Cardwell Single Drum Hoist, SRK Waukesha. No mast. Will accommodate Spudding Attachment. Excellent Condition. Model HL Cardwell Double Drum Drawworks, 140GK Waukesha. Convertible to Spudder. Good Shape. Both running in Kansas and priced right. Box D-400, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 1—Fairbanks Morse—Model BE 24 Diesel Engine 150 H.P. twin cylinder horizontal. 1—Set National Transit Reciprocating hot oil pump size 5¼ x 18 H.D.O.P. for diesel engine drive. 1—Set Worthington simplex steam reciprocating hot oil pumps, size 24 x 5 x 24. All of the above may be inspected on Pana Refining Co. location at Pana, Illinois. All in operating condition.

HALL-SCOTT DEFENDERS, 650 h.p., direct drive transmission. Hercules Diesel generator sets 18.75 KVA $1100. L. E. Northrop, Jr., 1225 Flanders Rd., LaCanada, Calif.

FOR SALE

3—10 x 4½ x 10 XOB Ingersol-Rand Compressors. Completely repaired with intercoolers. Also 20" Stroke Compressor Cylinders in most sizes, 6¼" to 26"

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Several Army Surplus 4½" x 6" Gaso Duplex 1860 Pumps—two piece skid mounted with Chrysler 8 cylinder engines. Will sell pumps only or complete units about half price.

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Phones: 132—Rockdale, Texas
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STEEL CASING—TUBING

(Available Immediate Delivery)

30,000 ft. 7" O.D. 17# Lapweld Casing
4,500 ft. 7" O.D. 20# Lapweld Casing
50,000 ft. 2⅜" O.D. 4# Lapw. Tubing

All used good condition with threads and couplings in 20 ft. random lengths. Attractively priced spot shipment Charleston, W. Va., area.

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Ph. 2-9128 Tulsa, Okla.

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FOR SALE: 3 New 10,000 bbl. A.P.I. Columbian Bolted Steel Tanks. 160—8000 & 10,000 Gal. Tank Cars. Darien Corp., 60 E 42nd St., N. Y., N. Y.

WICHITA (50) Spudder complete with Hercules engine, lines—tools—light plant—reamers—pipe sufficient for 2500 foot well. F. E. Hunt, Adair, Iowa.

EQUIPMENT WANTED

WANTED: Late model drilling rig capable of drilling 8500 feet complete with portable derrick, drill pipe, blowout preventer, hydromatic brake, all necessary tools and accessories. Must be in A-1 condition. Cash transaction. Box D-386, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Two Failing 1500' Core Drills or Failing 44s. West Drilling Company, Athens, Texas.

WILL BUY 37,000 or 55,000 bbl. tanks with steel roofs, either standing or cut down. Atlas Tank & Steel Co., P. O. Box 2297, Tulsa, Oklahoma.

HELP WANTED

HIGH type, responsible executive wanted as Manager Latin-American operations for substantial independent producing company entering foreign operations. Applicant should be college graduate, under 40 years of age; have minimum 15 years' experience in production and drilling work, particularly in high pressure oil and gas well completions. Applicant should speak Spanish fluently, have thorough experience in development Geology, be equipped to prepare and maintain adequate reservoir and engineering studies including repressuring and pressure maintenance. Excellent compensation. When replying, give full details. Our present employes not considered for this position. Box D-364, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Capable Oil and Gas Lease man familiar with West Texas area. Give references and past experience. Address Box D-404, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST: Independent producer wants man acquainted Southern Oklahoma, North Texas to watch plays, secure deals. Advise fully experience salary desired. Box D-396, The Oil and Gas Journal, Tulsa, Okla.

FOREIGN and Domestic Oil Employment Directory (including late supplement of oil companies and drilling contractors in Western Canada). Over 500 listings in drilling, production, refinery, natural gasoline, pipelines, geological, exploration, supplies, manufacturers, services and refinery and pipeline contractors, showing where to apply for jobs. Price $5.00. Oil Industry Mailing List, Box 2603, Tulsa, Okla. (Our 30th year).

HELP WANTED, SALESMAN: We want a man interested in adding several thousand dollars to his yearly income. He must be well established in the oil country trade in Houston. He should have other supporting lines that would be non-conflicting with electric motors and controls. We prefer a man over thirty, married, and with better than a high school education. If interested, give complete information in first letter. Reply to: Box D-384, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Engineer with experience in core analysis to supervise routine laboratory and research work and interpret routine results. Advanced degree preferred. Salary open. State experience, education, and salary expected. Continental Oil Company, Personnel Division, Ponca City, Oklahoma.

EXPERIENCED gravity personnel for foreign work, party chiefs, surveyors, and operators. All expenses. The best opportunity in the industry to make money and advance. Exploration Surveys, Inc., 5615 Daniels Avenue, Dallas 6, Texas.

PETROLEUM ENGINEER: Young man preferably some experience water flooding to supervise small water flood, work out operation and extension plans, assist operation stripper leases, and make deals for independent producer Oklahoma or Central Texas. Experience preferred. State complete experience and salary required. Box D-397, The Oil and Gas Journal, Tulsa, Okla.

HELP WANTED

MAN wanted to operate receding head Landis Pipe Threading Machine. Permanent job. Petroleum Pipe & Supply Co., P.O. Box 1168, Corpus Christi, Texas.

ENGINEERS, Executives, Technical Men Salaried positions—$3600 to $30,000. This confidential service for outstanding men who desire a change of connection, will develop and conduct preliminary negotiations without risk to present position. Send name and address for details. Tomsett Associates, 1204 Berger Bldg., Pittsburgh 19, Pa.

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GEOPHYSICIST—Bachelors degree geology. Two years graduate study. Seven years seismic experience including two and one-half years as party chief. Three years in South America. Desires position as senior computer or interpreter with oil company, foreign or domestic. Presently employed. Box C-389, The Oil and Gas Journal, Tulsa, Oklahoma.

LANDMAN, 2½ years major company, 30, single, B.A. degree; abstract & title experience, office management; desires position with future based on demonstrated ability. Box D-399, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES: PETROLEUM SPECIALTIES: B. S. Organic Chemistry, patents, five years research, three years sales and market development. Desires position with refinery to develop new industrial markets for solvents, waxes and oils. Box D-395, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST—30 yrs. old—2 yrs. roughnecking, 7 yrs. surface and subsurface geological work with major company in Canada, U. S., and South America, desires association with aggressive independent operator, or drilling contractor who is active in wildcatting. Prefer Rocky Mtn. area, or Canada. Pertinent details and references given on request. Box D-402, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES ENGINEER: REGISTERED professional engineer with college degree. Design, sales and field experience with drilling and production oil field equipment. Desires a sales position in the Southwest. Box D-383, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER: Age 45, 25 years experience in drilling and production operations. Supervisory experience in completion and workover operations as district engineer, tool pusher and production superintendent. Desire connection with independent operator. Will consider foreign employment. Box D-390, The Oil and Gas Journal, Tulsa, Oklahoma.

ACCOUNTANT-AUDITOR, CPA. Fifteen years diversified accounting and tax experience, principally in Oil Industry. Desires change. Box D-391, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 31, Ph. No. 131, Hobbs, New Mexico.

SALESMAN—Married man, 32, with B.S. Degree, major in Geology and Business Administration, wants job selling oil field equipment, supplies, or services. Box D-408, The Oil and Gas Journal, Tulsa, Oklahoma.

PIPING DESIGN ENGINEER and draftsman with fifteen years experience in design, detailing, supervision and construction of oil refinery piping. Best of references. Box D-407, The Oil and Gas Journal, Tulsa, Oklahoma.

DRAFTSMAN: Experienced piping draftsman, checker, squad boss and chief draftsman with Refinery Engineering contractors on varied projects; also, field experience. Desire job small company with construction program. Box D-406, The Oil and Gas Journal, Tulsa, Oklahoma.

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Tulsa, Oklahoma

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CALENDAR

March

American Petroleum Institute, Division of Production, Southwestern District meeting Adolphus Hotel, Dallas, March 8-10.

Texas Independent Producers and Royalty Owners Association, fourth annual meeting, Baker Hotel, Dallas, March 9.

Indiana Independent Petroleum Association, spring convention, Hotel Severin, Indianapolis, March 9-10.

American Chemical Society, Houston meeting, Shamrock Hotel, Houston, March 26-30.

North Texas Oil and Gas Association, Kemp Hotel, Wichita Falls, March 25.

Southern Gas Association, Galveston, Tex., March 27-29.

Western Petroleum Refiners Association, annual meeting, Plaza Hotel, San Antonio, March 27-29.

American Petroleum Institute, Division of Production, Mid-Continent district meeting Skirvin Hotel, Oklahoma City, March 29-31

April

American Petroleum Institute, board of directors meeting, Houston, April 3-4.

National Association of Corrosion Engineers, annual conference, Jefferson Hotel St. Louis, Mo., April 4-7.

American Chemical Society, Philadelphia meeting, Philadelphia, April 9-13.

American Society of Lubrication Engineers, annual convention, Hotel Statler, Detroit, April 10-12.

American Society of Mechanical Engineers, Hotel Statler, Washington, D. C., April 10-14.

Southwestern Gas Measurement Short Course, University of Oklahoma, Norman, Okla., April 11-13.

National Petroleum Association, Hotel Cleveland, Cleveland, Ohio, April 12-14.

American Petroleum Institute, Division of Production, Rocky Mountain district meeting, Gladstone Hotel, Casper, Wyo., April 13-14.

American Chemical Society, Detroit meeting, Detroit, April 16-20.

Petroleum Industry Electrical Association and Petroleum Electric Supply Association, joint conference, Shamrock Hotel, Houston, April 18-20.

Natural Gasoline Association of America, annual convention, Texas Hotel, Fort Worth, April 24-26.

American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists, and Society of Exploration Geophysicists, joint annual meeting Stevens Hotel, Chicago, April 24-27.

Oil Heat Institute of America and National Oil Heat Exposition, annual meeting, Commercial Museum, Philadelphia April 24-May 1.

American Petroleum Institute, Division of Production, eastern district meeting Cleveland Hotel, Cleveland, April 26-28

May

American Petroleum Institute, Division of Refining, midyear meeting, Hotel Cleveland, Cleveland, May 1-4.

Interstate Oil Compact Commission, spring meeting, Biloxi, Miss., May 4-6.

National Stripper Well Association, Biltmore Hotel, Los Angeles, May 7-9.

Independent Petroleum Association of America, midyear meeting, Biltmore Hotel Los Angeles, May 7-9.

American Gas Association, Natural Gas Department, spring meeting, Mayo Hotel Tulsa, May 8-9.

Liquefied Petroleum Gas Association, annual convention, Palmer House, Chicago, May 8-11.

American Petroleum Institute, Division of Production, Pacific Coast district meeting, Biltmore Hotel, Los Angeles, May 11-12.

American Gas Association, production and chemical conference, Hotel New Yorker, New York, May 22-24.

American Institute of Chemical Engineers, regional meeting, New Ocean House, Swampscott, Mass., May 28-31.

Gas Technology Short Course, Texas College of Arts and Industries, Kingsville, Tex., May 29-31.

June

National Oil Scouts and Landmen's Association, Skirvin Tower Hotel, Oklahoma City, June 8-10.

American Society of Mechanical Engineers, oil and gas power division, Lord Baltimore Hotel, Baltimore, June 12-16.

Pennsylvania Grade Crude Oil Association, Hotel William Penn, Pittsburgh, Pa., June 15-16.

American Society of Mechanical Engineers, Hotel Statler, St. Louis, June 19-23

Canadian Gas Association, annual convention, Manior Richelieu Hotel, Murray, Quebec, Canada, June 20-24.

American Society for Testing Materials annual meeting Chalfonte-Haddon Hall, Atlantic City, N. J., June 26-30.

American Petroleum Institute, midyear division of production and standardization conference, Brown Palace Hotel, Denver, June 26-30.

August

Interstate Oil Compact Commission, summer meeting, French Lick, Ind., August 3-5.

September

American Society of Mechanical Engineers and Instrument Society of America, Municipal Auditorium, Buffalo, N. Y., September 11-15.

National Petroleum Association, Hotel Traymore, Atlantic City, N. J., September 13-15.

Instrument Society of America, annual instrument conference and exhibit, Memorial Auditorium, Buffalo, N. Y., September 18-22.

American Society of Mechanical Engineers, petroleum mechanical engineering conference, Roosevelt Hotel, New Orleans, September 25-27.

October

American Gas Association, annual convention, Atlantic City, N. J., October 2-6.

Mid-Continent Oil and Gas Association, Texas division, Dallas, October 4-5.

American Association of Oilwell Drilling Contractors, annual meeting Mayo Hotel, Tulsa, October 9-10.

November

American Petroleum Institute, annual meeting, Biltmore and Ambassador Hotels, Los Angeles, November 13-16.

American Society of Mechanical Engineers, Hotel Statler, New York, November 26-December 1.

NOMADS

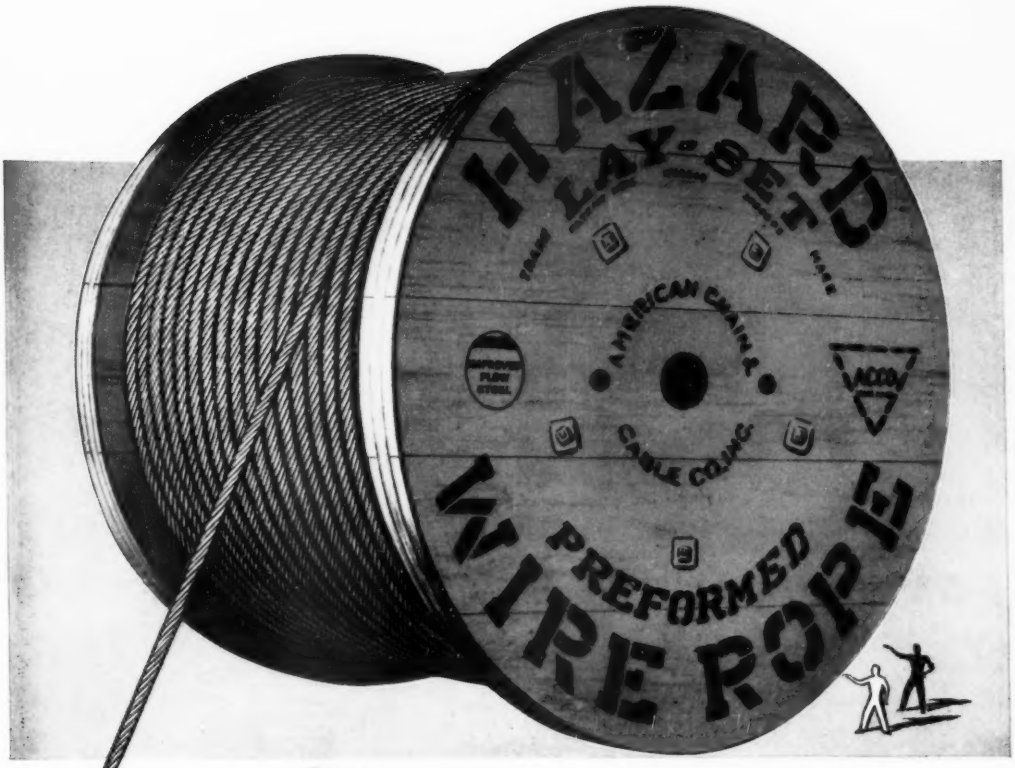
Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Dallas-Fort Worth Nomads, first Monday of each month, Greater Dallas Club.

Houston Nomads, second Monday of each month, Ye Ole College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month, Jonathan Club.

New York Nomads: March 6, April 3, May 10 (annual invitation dinner), all at Louis Sherry's, and June 13-15, golf party, Westchester.



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